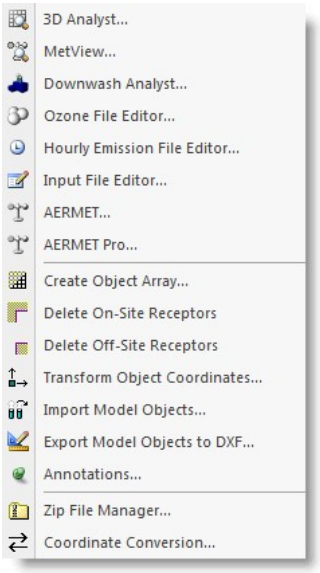
Productivity Tools (Tools Menu)

The Tools Menu contains the productivity tools available in BREEZE AERMOD/ISC.



Item	Description
3D Analyst	If installed, will launch the BREEZE 3D Analyst application to display output results.
MetView	Launches the meteorological data viewer and windrose application.
Downwash Analyst	Launches the BREEZE Downwash Analyst for evaluating building downwash zones.
Ozone File Editor	Launches the ozone file editor which will allow you to create and edit ozone input files for use with the Ozone options in the Control Options form.
Hourly Emission File Editor	Launches the editor that assist in creating hourly emission files.
Input File Editor	Launches the editor that allows the user to edit the ASCII AERMOD input file directly.
AERMET	Only available in AERMOD. Launches the AERMET "Lite" application for creating model-ready meteorological data from .MRG files.
AERMET Pro	Only available in AERMOD. Launches AERMET Pro, the full BREEZE AERMET application.
Create Object Array...	Launches the tool that allows for the creation of multiple model objects with the same parameters but at varying distances along the x and y axes.
Delete On-Site Receptors	Select to remove receptors from within boundary receptors.
Delete Off-Site Receptors	Select to remove receptors from outside boundary receptors.
Transform Object Coordinates...	To change the coordinates of multiple model objects by the same amount (e.g., shifting, rotating).
Import Model Objects...	Allows the importation of model objects, including sources, receptor grids, discrete receptors, boundary receptors and buildings from other projects.
Export Model Objects to DXF	Launches the wizard to export model objects to a DXF file.
Annotations	Launches the option for adding non-model-related objects to a project.
Zip File Manager...	Launches the utility to manage input and output files associated with the model scenario.
Coordinate Conversion...	Launches the tool that allows for conversion between coordinate systems (e.g., UTM and Latitude/Longitude).

3D Analyst

Select features of BREEZE 3DAnalyst are included in BREEZE AERMOD/ISC. The real power 3DAnalyst is through the use of three additional modules. Not everyone

will need or desire the additional functionality provided by these modules, therefore, they are available as add-on's the base AERMOD/ISC application.

The BREEZE 3D Analyst User Guide can be accessed through the Home tab of the 3D Analyst application.

BREEZE MetView

BREEZE MetView

Trinity Consultants, Inc.

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Application Overview

BREEZE MetView is a powerful data analysis tool which gives users unprecedented abilities in reviewing, modifying, and analyzing meteorological data. In addition to generating graphical wind roses, displaying time series plots of meteorological variables, and creating tables of data, BREEZE MetView also includes custom data rose options to create plots of tables of other variables compared against wind direction. The program also allows for data to be appended to opened data files thus expanding the analysis capabilities to new ground.

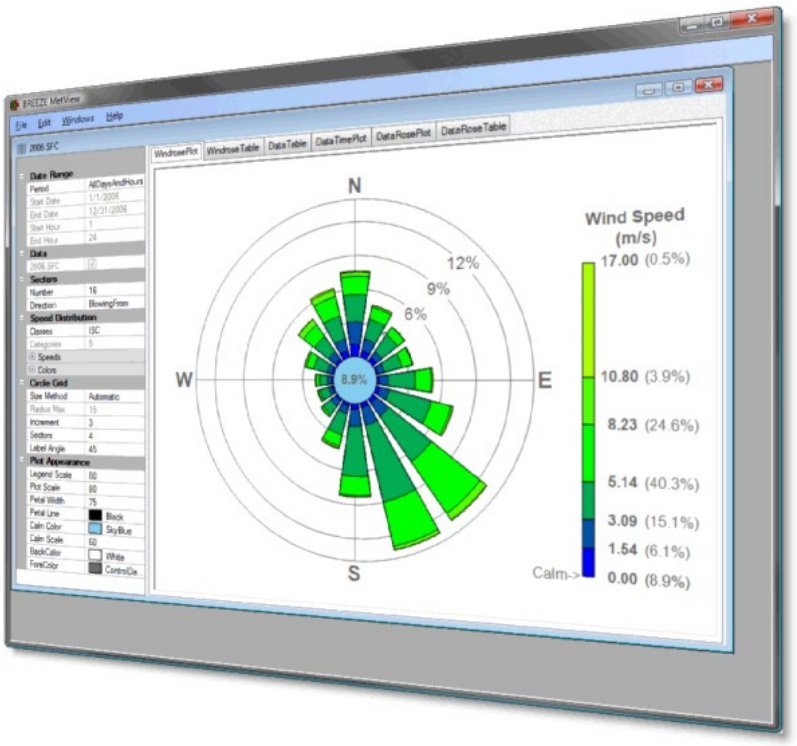
BREEZE has a simple, conventional user interface. Each file opened in MetView is displayed in a single Data Display Window which consists of six different Tabs and a table of Control Options. Across the top of the main window resides a title bar containing the name of the application. Below the title bar is the Toolbar.

When starting MetView, the project window will be empty until a data file is opened. After opening a data file, the display window becomes populated. Several data files can be open at one time in MetView. Opening extra data files will bring up new data display windows in the main display.

BREEZE MetView is available in two performance levels:

1. MetView Lite - installs with BREEZE AERMOD. This version will create graphical wind roses, display wind rose frequency data, and display data in tabular format.
2. MetView Pro - contains all the features and functions of the program. This includes the ability to export images and tables, create time series graphs of meteorological variables, append data files together, create graphical data roses for comparing variables other than wind speed to wind direction, and many more features.

NOTE: MetView Pro is a separate program from MetView. To purchase MetView Pro, please contact us.



Main window display in BREEZE MetView

File Types

BREEZE MetView allows you to open a number of different meteorological files. These file types are extension dependent.

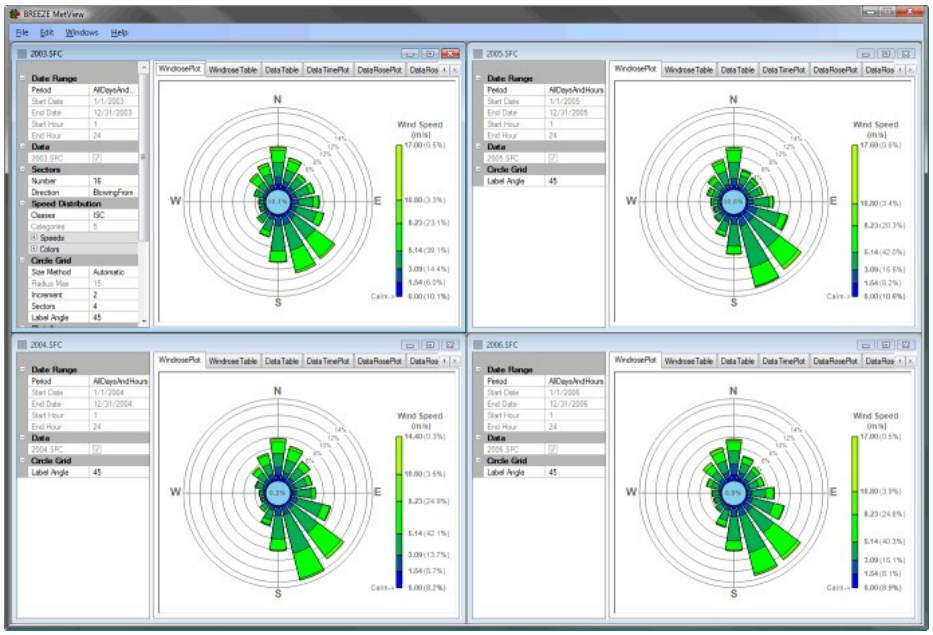
File Type	Extensions	Description
ADMS	**.adm**	Meteorological data in comma-delimited format used in the ADMS dispersion model.
AERMOD	**.sfc, .pfl**	Processed meteorological surface (.SFC) and profile (.PFL) data used in the AERMOD dispersion model.
ISC	**.asc**	ASCII format meteorological data utilized in the ISCST3 dispersion model.
MEDOC	**.sfc2**	Meteorological data used in the Multiscale Environmental Dispersion Over Complex Terrain dispersion model
Raw Surface		Hourly surface meteorological data in the following formats:
CD-144	.met, .fil	Card Deck 144
HUSWO	.hsw	Hourly United States Weather Observations
SAMSON	.sam	Solar and Meteorological Surface Observation Network
SCRAM	.dat	Support Center for Regulatory Air Models

BREEZE MetView will also open pollutant files (.bpd). These are processed data files which contain pollutant data from U.S. EPA AIRS database. You can contact the data processing group at BREEZE Software to obtain this data.

MetView Pro uses a file archive system similar to that in BREEZE AERMOD. When files are appended together, they can be saved to a MetView Zipped file (.mvz). This project archive will zip all of the appended files together in one convenient package.

Viewing Data

The display window allows you to visualize meteorological data in several ways. You can view a wind rose plot, wind rose table, or data table. MetView Pro includes the time series plot, data rose plot, and data rose table views. The ability to open multiple files at the same time allows you to view all tabs of one file simultaneously, and data is organized intuitively via a convenient tabbed layout.

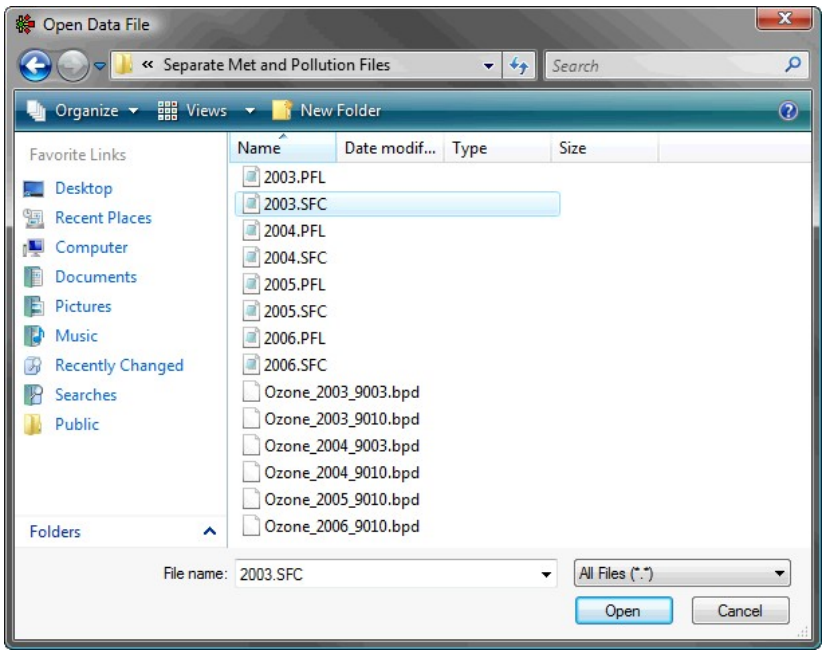


Multiple file display showing four different meteorological files.

Opening a Data File

BREEZE MetView can open, display, and process multiple meteorological data files at one time.

To invoke the Open File dialog, select Open in the File Menu. In the Open File dialog select a file type, navigate to your data folder, select the file name, and press the Open button (or just double click the file name).



Menus and Toolbars

The menu bar accesses all the functions that MetView uses to display data. Selecting a menu item will either toggle a property On/Off, execute a function, or open a dialog box.

Frequently used menu items can also be executed using MetView's Toolbar and hot keys. The following sections provide brief descriptions of all the items contained in MetView's menus. References are provided to corresponding toolbar buttons, hot keys, and dialog boxes.

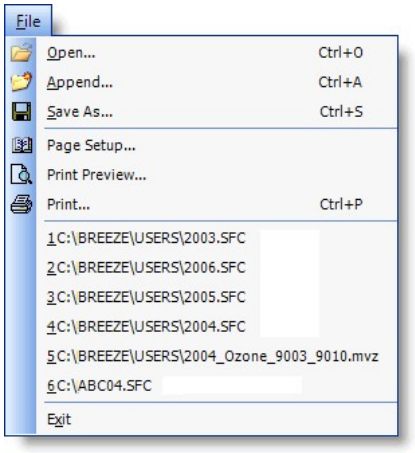
Note: Only product-specific menu items and dialogs are documented in this manual. For example, we assume that the standard File | Open dialog is familiar and self-explanatory.

List of Menus

Menu	Description
File	Contains functions for opening, saving, printing, and appending data files.
Edit	Copy images from wind rose, data rose, and time series plots.
Windows	Options for arranging the Data Display Windows within BREEZE.
Help	Accesses the MetView User's Guide. This menu also provides information about the software such as release notes and version number.

File

The File menu contains the basic options for opening data files. It also records a history list so the user can quickly open the most recently used files.



File Menu

Item	Description
Open...	Opens the Open File dialog box
Append...	Function for appending external files to the currently opened data file. This function is not available in MetView Lite.
Save As...	Allows user to save any modifications made to the file
Page Setup	Sets page parameters for printing
Print Preview	Displays print preview of selected display view
Print	Prints selected display view
History	Lists the most recently opened files
Exit	Exits MetView

Edit

NOTE: These functions are not available in MetView Lite.

There are two edit menus within BREEZE MetView: one for plot views and another for table views.

The Edit menu for plotting contains the image capture functions Copy and Copy To. The Tabs with image windows (e.g., Windrose Plot, Data TimePlot, DataRose Plot) use these image capture functions. The tabular Edit menu has additional functions.

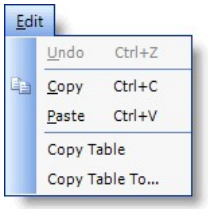
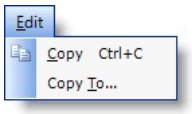


Table Edit Menu

Table Edit Item	Description
Undo	Removes the previous operation performed
Copy	Copy selected cells to clipboard
Paste	Paste data stored to clipboard
Copy Table	Copies entire table to the clipboard
Copy Table To...	Saves the selected table as a Microsoft Excel spreadsheet (.xls)

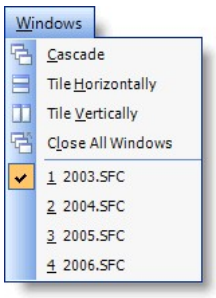


Plotting Edit Menu

Plot Edit Item	Description
Copy	Copy image to the clipboard
Copy To...	Allows user to save image as an external raster image (.jpg, .bmp, .gif)

Windows

The Windows Menu provides standard mechanism to arrange all the Data Display Windows and a standard mechanism to select (i.e. bring forward and make active) one Display Window from a list of all open Display Windows.

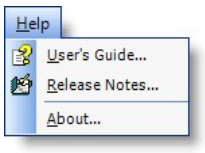


Windows Menu

Item	Description
Cascade	Organizes open display windows in such a way that they overlap each other.
Tile Horizontally	Organizes open display windows in such a way that they each are sized to show the entire display window with horizontal placement.
Tile Vertically	Organizes open display windows in such a way that they each are sized to show the entire display window with vertical placement.
Close All Windows	Closes all open windows.

Help

The Help menu provides access to this user guide, which can also be accessed at any time by selecting the Help | User's Guide menu item. You can check whether you are using the latest version of MetView.



Help Menu

Item	Description
User's Guide...	Opens this user guide
Release Notes...	List of historical release notes for the BREEZE MetView program
About...	Displays the version number and other information about this program

Data Display

Opening a new file will open a new data display window in the main display. MetView is capable of opening several different meteorological files at a time.

Each display window opened in MetView has the following features:

Tabbed Interface: Each of the six functions is available via the tabs in the display window.

Control Options: Each plot and table is controlled by the preferences set in the control options. The functions range from changing the displayed time period to applying different colors to the plots.

Tabs

There are six tabs in the display window that opens with each meteorological file:

Windrose Plot: Displays a custom graphical wind rose

Windrose Table: Tabular data corresponding to the options chosen in the Windrose Plot tab

Data Table: The opened data file is shown in a tabular format complete with column headings and statistical information

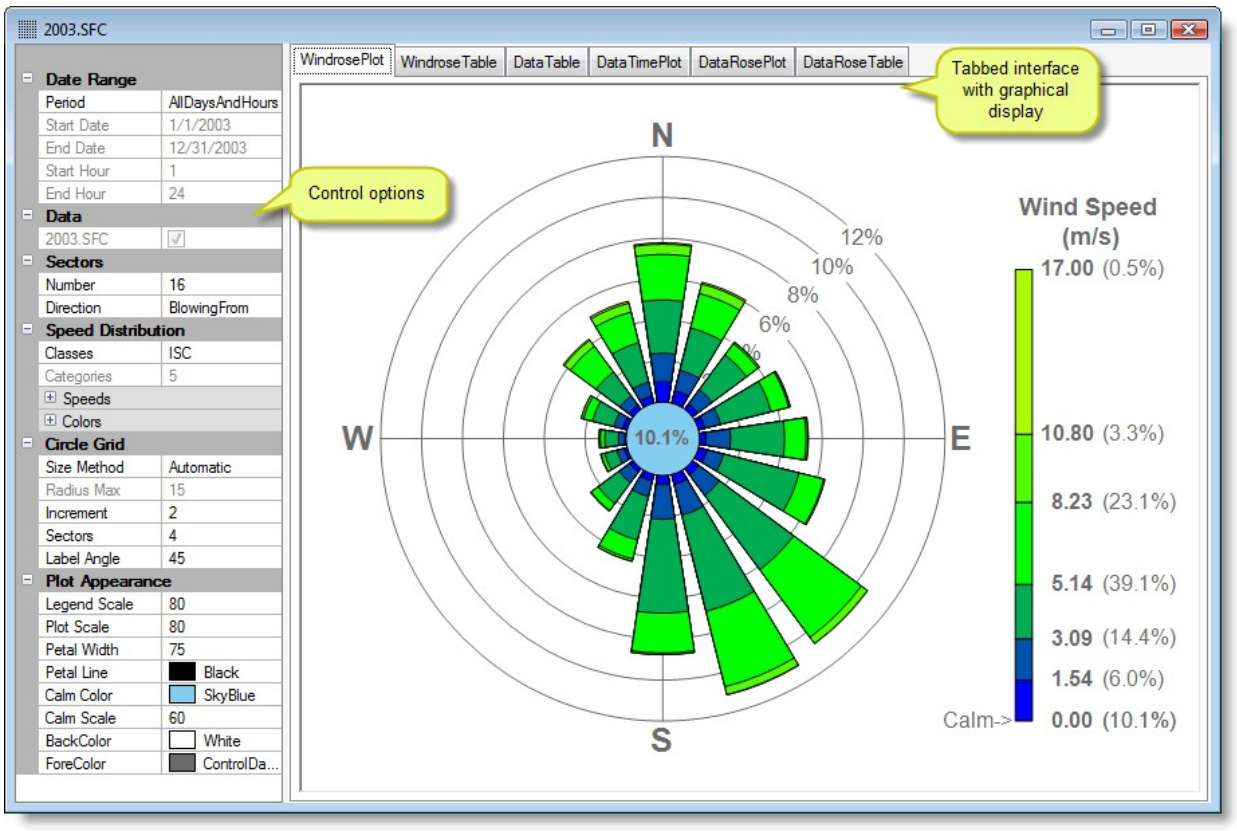
Data TimePlot: Customizable time series plot of variables present in the opened data file (not available in MetView Lite)

DataRose Plot: Displays a custom graphical data rose (not available in MetView Lite)

DataRose Table: The tabular data for the graphical data rose (not available in MetView Lite)

Windrose Plot

The Windrose Plot tab displays the graphical wind rose for opened data file. A wind rose is used to display the graphical relationship between wind speed and wind direction. BREEZE MetView gives users a wealth of functions to customize the plot to their liking. The customization options are discussed in the Control Options section of this guide.

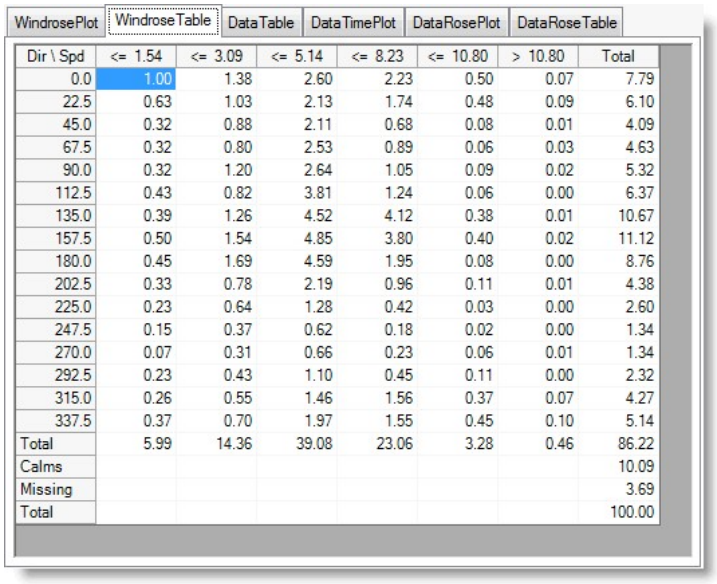


Windrose Plot Display View

Windrose Table

The Windrose Table tab shows the frequency table of data displayed in the Windrose Plot display view.

The table displays the frequency of wind at various combinations of wind speed and direction as well as the frequency of calm hours, missing hours, and totals for each direction and speed category. The wind direction sectors and wind speed categories can be changed by utilizing the appropriate tools in the Control Options.



WindrosePlot | WindroseTable | DataTable | DataTimePlot | DataRosePlot | DataRoseTable

Dir \ Spd	<= 1.54	<= 3.09	<= 5.14	<= 8.23	<= 10.80	> 10.80	Total
0.0	1.00	1.38	2.60	2.23	0.50	0.07	7.79
22.5	0.63	1.03	2.13	1.74	0.48	0.09	6.10
45.0	0.32	0.88	2.11	0.68	0.08	0.01	4.09
67.5	0.32	0.80	2.53	0.89	0.06	0.03	4.63
90.0	0.32	1.20	2.64	1.05	0.09	0.02	5.32
112.5	0.43	0.82	3.81	1.24	0.06	0.00	6.37
135.0	0.39	1.26	4.52	4.12	0.38	0.01	10.67
157.5	0.50	1.54	4.85	3.80	0.40	0.02	11.12
180.0	0.45	1.69	4.59	1.95	0.08	0.00	8.76
202.5	0.33	0.78	2.19	0.96	0.11	0.01	4.38
225.0	0.23	0.64	1.28	0.42	0.03	0.00	2.60
247.5	0.15	0.37	0.62	0.18	0.02	0.00	1.34
270.0	0.07	0.31	0.66	0.23	0.06	0.01	1.34
292.5	0.23	0.43	1.10	0.45	0.11	0.00	2.32
315.0	0.26	0.55	1.46	1.56	0.37	0.07	4.27
337.5	0.37	0.70	1.97	1.55	0.45	0.10	5.14
Total	5.99	14.36	39.08	23.06	3.28	0.46	86.22
Calms							10.09
Missing							3.69
Total							100.00

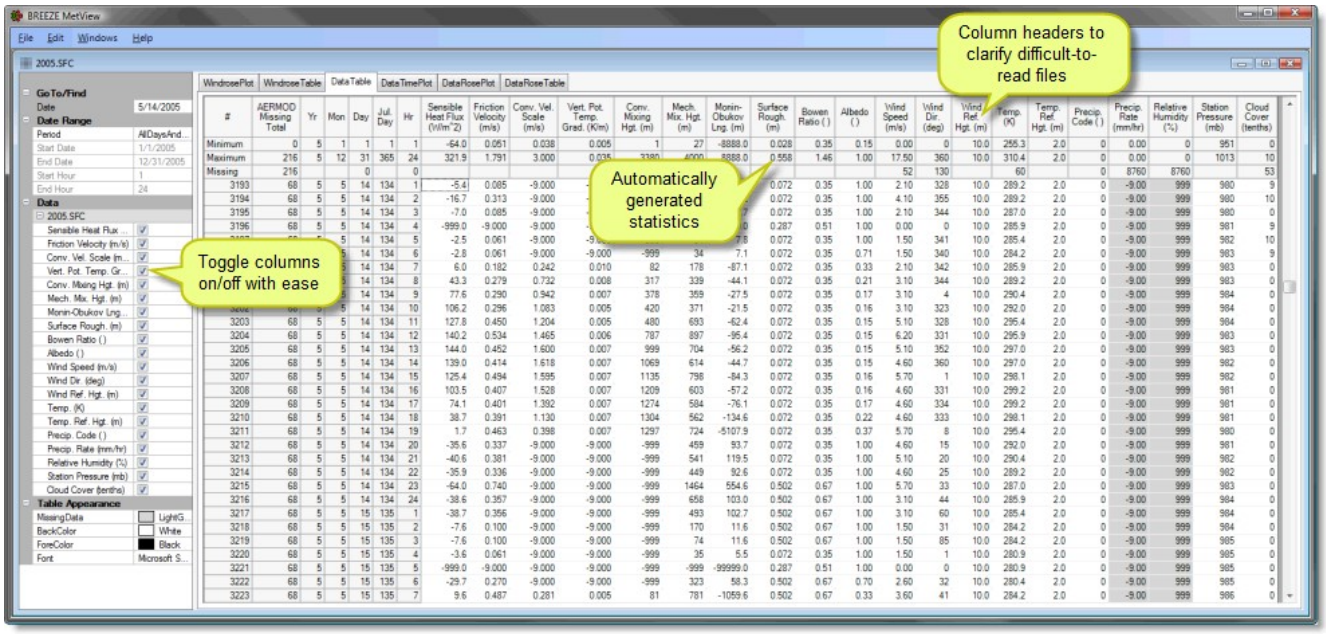
Windrose Table Display

Data Table

The Data Table displays all the parameters within a file in tabular format. The control options help users create custom tables through the use of a date range tool as well as the ability to easily toggle columns of data on or off. The column headers also make it easy to define parameters from data files which have to clear header information.

The first three rows of the table display the minimum, maximum, and number of missing values for each parameter.

For AERMOD-ready surface files, BREEZE MetView also has a missing hours counter. This makes it easy to find those hours for further data analysis.


Column headers to clarify difficult-to-read files
Automatically generated statistics
Toggle columns on/off with ease

Data Table for an AERMOD surface meteorological file

Control Options

The Control Options table is the user's customization station. The options within the Control Options menu allow the user to create unique plots and tables for every project. Each tab has unique options which apply only to that product, while the date range option will apply to every function in each opened file. Select a category below to learn more about each option within the menu.

Date Range

Wind Rose Options

Data Table Options

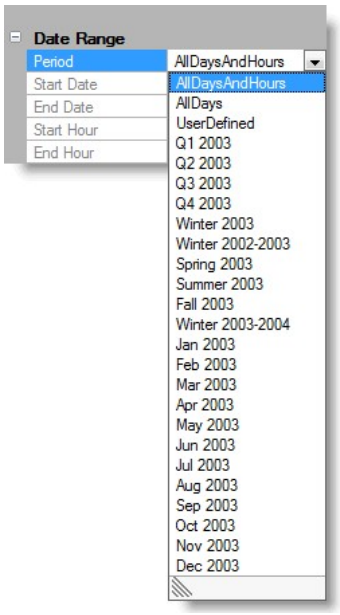
Data TimePlot Options (not available in MetView Lite)

Data Rose Options (not available in MetView Lite)

Date Range

The Date Range function is the only static function in the Control Options menu - that is, the date range selected by the user will be applied to every other function in the program. There are five options in the Date Range group: Period, Start Date, End Date, Start Hour, and End Hour.

Period



Drop-down list of Period options from a 2003 met data file

The user can select from several predetermined date ranges using the drop-down list next to the Period heading. The options are:

- AllDaysAndHours - Begins on the first hour of the first day and ends on the last hour of the last day in the meteorological file;
- AllDays - Begins on the first day and ends on the last day of the meteorological file and allows user to select certain hours of each day using the Start Hour and End Hour functions;
- UserDefined - Allows the user to specify the exact date range using the other four functions. The Start Date and End Date functions will only become available if the "UserDefined" option is selected from the drop-down list;
- Q1 - Begins on January 1 and ends on March 31, also allows the user to specify certain hours for each day;
- Q2 - Begins on April 1 and ends on June 30;
- Q3 - Begins on July 1 and ends on September 30;
- Q4 - Begins on October 1 and ends on December 31;
- Winter - Meteorological winter is defined as the period extending from December through February. There are three ways to define Winter in MetView:

1. Using the image above as the example, Winter 2003 will display data from January, February, and December from 2003

2. Winter 2002-2003 will display January and February 2003

3. Winter 2003-2004 will display December 2003

If they file spans more than one year (e.g., December 2002 through January 2004), then these months would be included in the Winter 2002-2003 and Winter 2003-2004 options respectively.

- Spring - Includes the months of March, April, and May;
- Summer - Includes the months of June, July, and August;
- Fall - Includes the months of September, October, and November.
- Individual Months - Shows all days from the selected month.

NOTE: The seasonal options are done by month and do not represent the exact season (i.e. MetView Spring spans March 1 through May 31 whereas the vernal spring season beings around March 20 and ends approximately June 20.

Start Date

Date at which the four tools will begin analyzing the meteorological data. This function is only available when the UserDefined period is selected.

End Date

Date at which the four tools will end analyzing meteorological data. This function is only available when the UserDefined period is selected.

Start Hour

Allows the user to select a specific beginning hour to analyze. If one of the predefined periods is selected, then every day within the selected period will begin at the hour chosen.

End Hour

Allows the user to select a specific end hour to analyze.

Wind Rose Tools

When using the Windrose Plot or the Windrose Table tools, the number of wind direction sectors and wind speed distribution categories can be changed in the Control Options. The colors of the wind rose can also be customized here. The tools will only change the way the data is displayed. Changing wind rose options with these tools does not modify the data in any way.

Data	
2003.SFC	☑
Sectors	
Number	16
Direction	BlowingFrom
Speed Distribution	
Classes	ISC
Categories	5
Speeds	
Speed 1	1.54
Speed 2	3.09
Speed 3	5.14
Speed 4	8.23
Speed 5	10.8
Colors	
Color 1	0, 0, 255
Color 2	0, 85, 170
Color 3	0, 170, 85
Color 4	0, 255, 0
Color 5	85, 255, 0

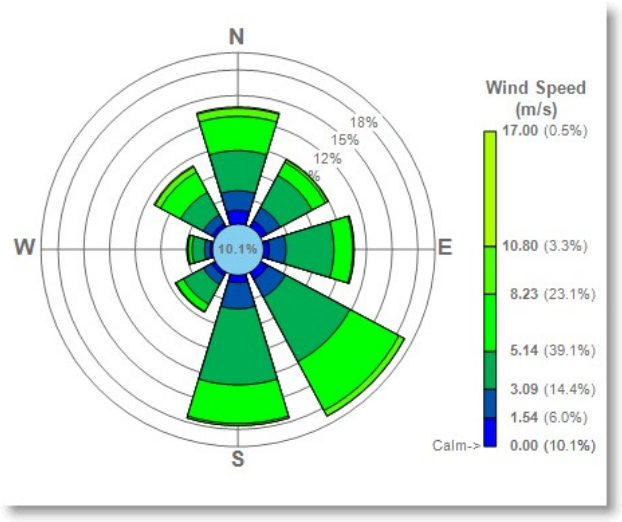
Custom options available in the Control Options when using the Windrose Plot or Windrose Table tools. The default options are shown.

Data

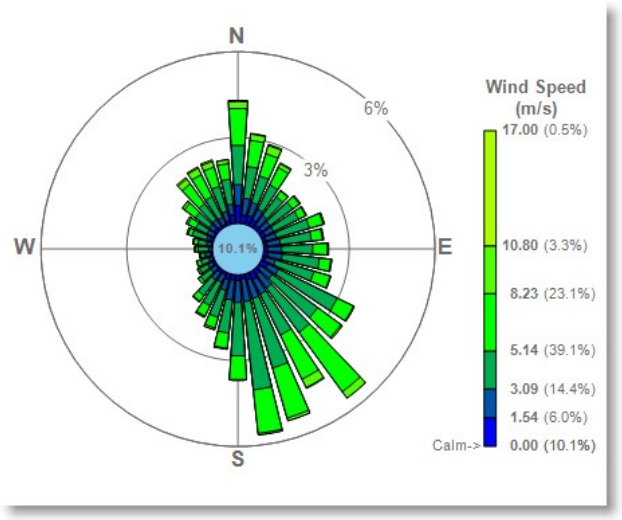
Shows which data file is being displayed. If multiple files are appended together, only one file may be displayed at a time.

Sectors

The number of wind direction sectors, or petals, are defined with this function. The number can range from a minimum of 4 to a maximum of 36 in multiples of 4. With this function, the user can specify whether the wind direction is defined by where the wind is blowing from or where it is blowing to. This can depend on what type of dispersion modeling analysis the data will be used for: AERMOD-ready meteorological data uses the BlowingFrom wind direction while ISC-ready meteorological data uses the BlowingTo option.



A windrose with 8 wind direction sectors



The same windrose with 36 wind direction sectors

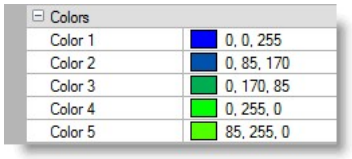
Speed Distribution

The user can select from three different classes on wind speed distribution classes:

- Automatic - Uses even intervals of wind speed based on the maximum recorded wind speed. Selecting this option allows the user to change the number of categories from 1 to 10.
- UserDefined - Makes the Speeds function unhidden and allows the user to specify anywhere from 1-10 custom wind speed distribution levels.
- ISC - The default option for all files. This option uses five wind speed categories: 1.54, 3.09, 5.14, 8.23, and 10.80 meters/second.

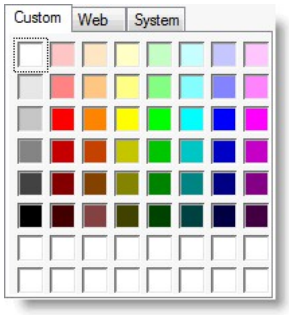
Colors

The Colors drop-drop down menu allows the user to select their own colors for the windrose plot. Each of the three available palette gives the user many different options to customize the windrose in any way they choose.



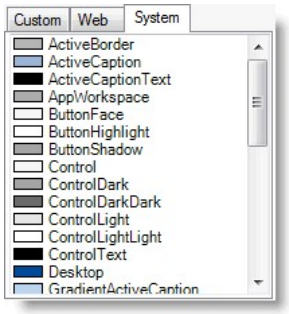
Default Color Scheme

To change the color of a sector, simply select the color in the Colors drop-down menu. The palettes are divided into three tabs:



Custom Color Palette

Web Color Palette



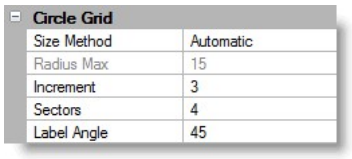
System Color Palette

Subsequent files that are opened will keep the user defined color scheme until the program is closed. MetView will revert to the default color scheme the next time it is opened.

Custom Windrose Plot

The Windrose Plot tab consists on two unique custom groups: Circle Grid and Plot Appearance. Both tools can be used to modify the appearance of the wind rose.

Circle Grid



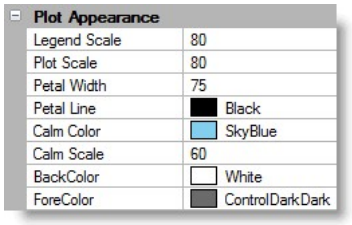
Circle Grid menu

The circle grid menu modifies the polar grid that the wind rose is plotted on.

- **Size Method -** The user can use the size method tool to make the wind rose appear larger or smaller. "Automatic" sizes the polar grid so that the wind rose takes up the maximum amount of space. "RadiusMax" allows the user to specify a specific radius for the percentage rings.
- **Radius Max -** Only available when the RadiusMax Size Method is selected. Must be between 1 and 100.
- **Increment -** Number of percentage rings displayed on the polar grid. Must be between 1 and 25.
- **Sectors -** The number of wind direction sectors displayed on the polar grid. Must be a multiple of 4 ranging from 4 to 36.
- **Label Angle -** Allows the user to move the labels of the percentages on the grid so that they can be read more easily.

For the Increment, Sectors, and Label Angle tools, each one can be changed by either typing in a number or by moving the slider to the left or right.

Plot Appearance



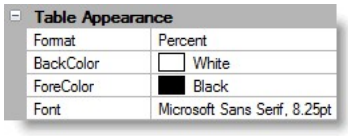
Plot Appearance menu

The Plot Appearance tool modifies the physical appearance of the wind rose plot in the viewing window.

- **Sync Plots** - Allows users to sync plots if multiple files of the same file type are opened at the same time. This is set to "False" by default so that files of differing file formats can be opened at the same time.
- **Legend Scale -** Makes the legend, which displays wind speed sectors, either larger or smaller. Can be modified by typing in a new number or moving the slider bar left or right.
- **Plot Scale -** Changes the size of the wind rose plot with respect to the legend scale. Modified in the same way as the Legend Scale.
- **Petal Width -** Changes the size of each petal of the wind rose. Must be between 5 and 100.
- **Petal Line -** Allows the user to change the outline of the petals.
- **Calm Color -** Changes the color of the calm sector circle in the center of the wind rose plot.
- **Calm Scale -** Makes the calm sector circle larger or smaller with respect to the wind rose petals.
- **BackColor -** Changes the background color of the plot.
- **ForeColor -** Changes the color of the polar grid and all text within the plot.

Custom Windrose Table

Table Appearance



Custom windrose table menu

The Table Appearance group is the only unique custom option available for the Windrose Table function.

- **Format -** Consists of three options: Fractional, Percent, or Count. Each option will automatically change the numbers in the table to fractions, percents (decimal from 0.00-1.00), or a total count.
- **BackColor -** Changes the background color of the table. Modified in the same way as the Speed Distribution colors.
- **ForeColor -** Changes the foreground color of the table.
- **Font -** Changes the font used in the table. To modify, select the browse button to open the Font dialog box.

Data Table Tools

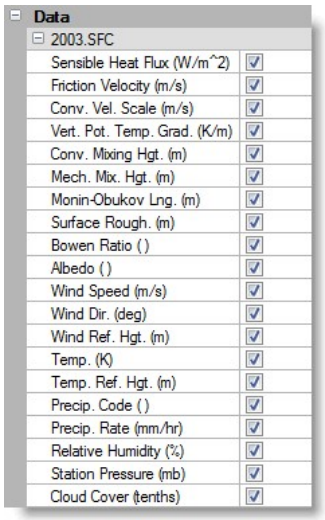
The Data Table function has customization groups which allow the user to change how data are displayed.

Go To / Find

Go To / Find menu

This function moves the table to a user-defined date. Select the drop-down arrow to view a calendar or type the date in MM/DD/YYYY format.

Data



Example of the Data group using an AERMOD-ready surface file.

The Data group will change based on the type of file that is opened by the user. MetView recognizes the data contained in various meteorological files and makes the headings available to plot via this menu. Selecting or Deselecting columns will toggle them on or off in the display view.

When multiple files are appended together, the columns for both files will be displayed under a header line for each file. The file listed first will have their columns displayed first.

Table Appearance

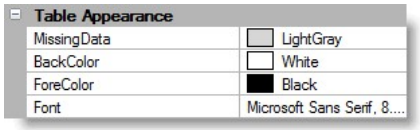


Table Appearance group from Data Table control options

The Table Appearance group controls some aesthetic features of the Data Table.

- **MissingData -** When AERMOD-ready surface files are opened, MetView will highlight missing hours with the specified color which is modified in the same way as the Speed Distribution colors in the wind rose functions.
- **BackColor -** Changes the background color of the table.
- **ForeColor -** Changes the foreground color of the table.
- **Font -** Changes the font used in the table. To modify, select the browse button to open the Font dialog box.

Downwash Analyst

NOTE: Downwash Analyst is a separate program from BREEZE AERMOD/ISC. To purchase Downwash Analyst, please contact us.

BREEZE Downwash Analyst is a tool to help AERMOD dispersion modelers 1) visualize and better understand how BPIP (Building Profile Input Program) generates the BPIPs (Building Profile Input Parameters) used by PRIME (Plume Rise and Building Downwash Model), and 2) visualize and better understand how the BPIPs are used by PRIME to compute the cavity and wake geometry used to modify plumes (i.e. induce downwash) within AERMOD.

In general, the BPIP processor produces two results:

1. The maximum GEP (Good Engineering Practice) stack height for each stack as a function of the neighboring building geometry and 1440 wind directions.
2. The maximum HWE (Height of Wake Effect) and the BPIPs (Building Profile Input Parameters - height, width, length, X-shift, and Y-shift) for 36 wind directions around each stack.

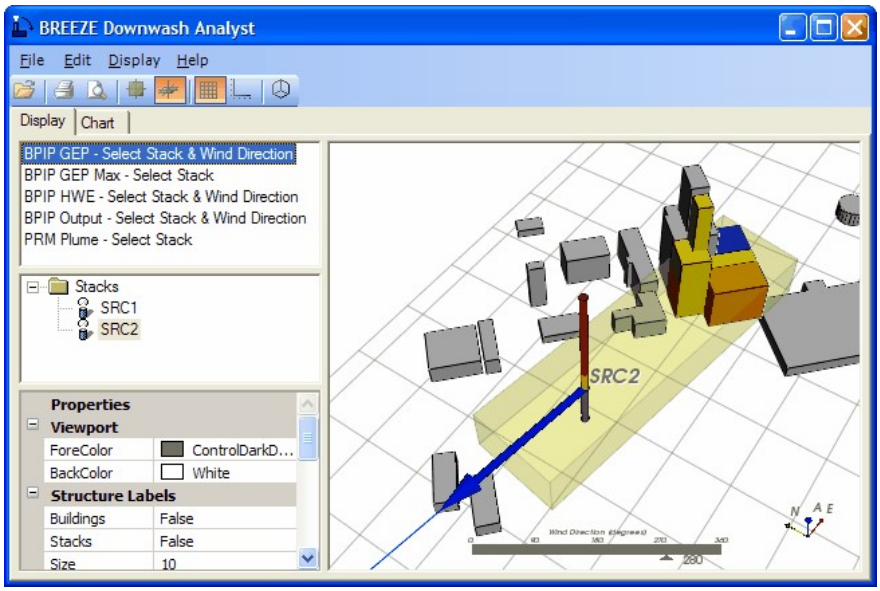
The information derived while computing the maximum GEP heights is later used to compute the maximum HWEs and BPIPs. The computation of both results follow a similar procedure:

If, for a given wind direction, there are no building tiers directly upwind or immediately downwind of a stack, the stack GEP height or HWE and BPIPs are set to zero. For a single tier near a stack, BPIP computes the tier's profile parameters and SIZ (Structure Influence Zone - GEP-SIZ when computing GEP heights and HWE-SIZ when computing HWE and BPIPs) for each wind direction around the stack. Each time (i.e. each wind direction) the stack is within the tier's SIZ, the GEP height or HWE and BPIPs are computed and saved. Otherwise, all are set to zero. When multiple tiers are in the vicinity of a stack, BPIP computes profile parameters and SIZs for all possible tier-group combinations and determines which single-tier or tier-group produces the highest GEP height or HWE for each wind direction. Like before, each time (i.e. each wind direction) the stack is within a single-tier's or tier-group's SIZ, the GEP height or HWE and BPIPs are computed. The GEP height or HWE and BPIPs of the single-tier or tier-group that produces the highest GEP or HWE are saved. Otherwise, all are set to zero.

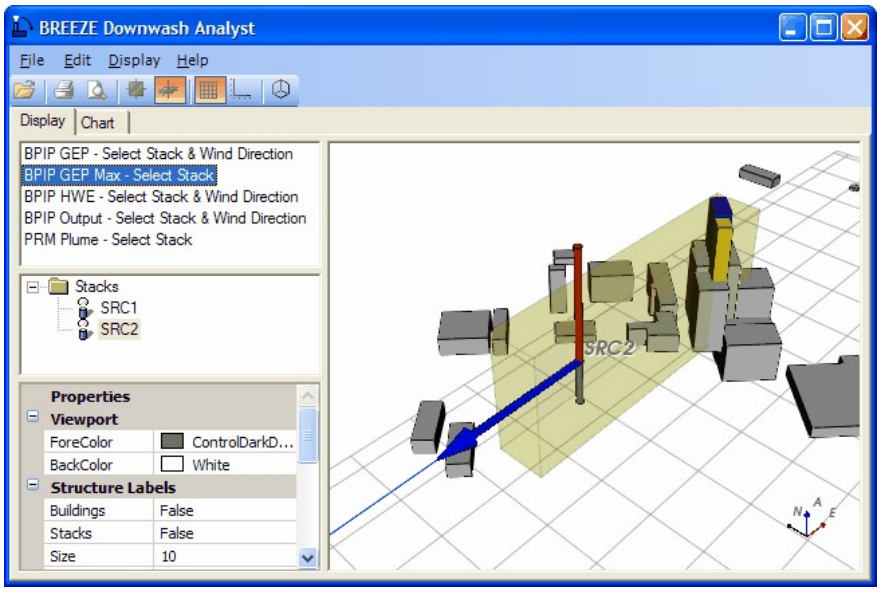
Though the entire two-step process is relatively complicated, the BREEZE Downwash Analyst provides a simple way to visually observe how BPIP locates stacks within the GEP-SIZs and HWE-SIZs of the single-tiers or tier-groups that produce the maximum GEP heights or HWEs, for every wind direction.

BPIP Analysis Modes

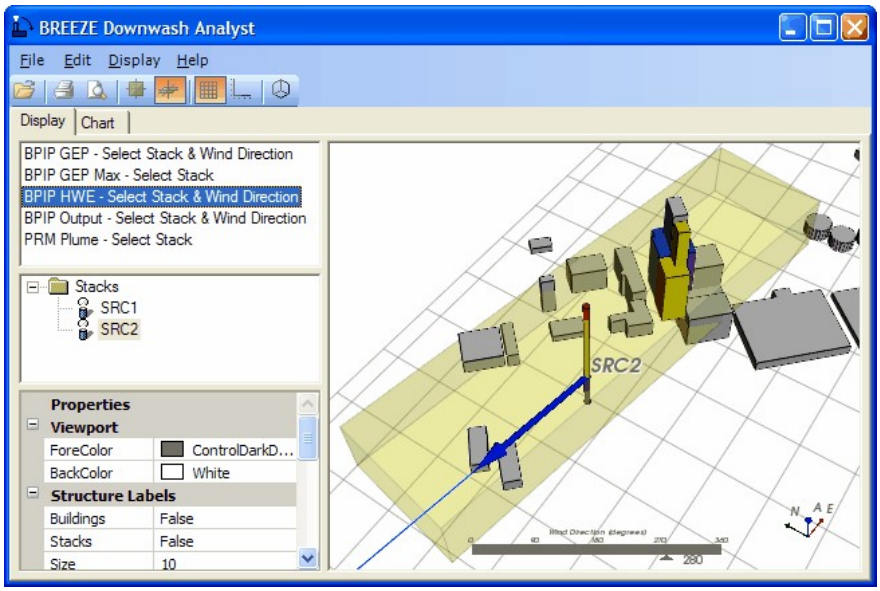
BPIP GEP - Select Stack & Wind Direction - Displays the single-tier or tier-group, with it's GEP-SIZ, that produces the maximum GEP stack height for a selected stack and a selected wind direction.



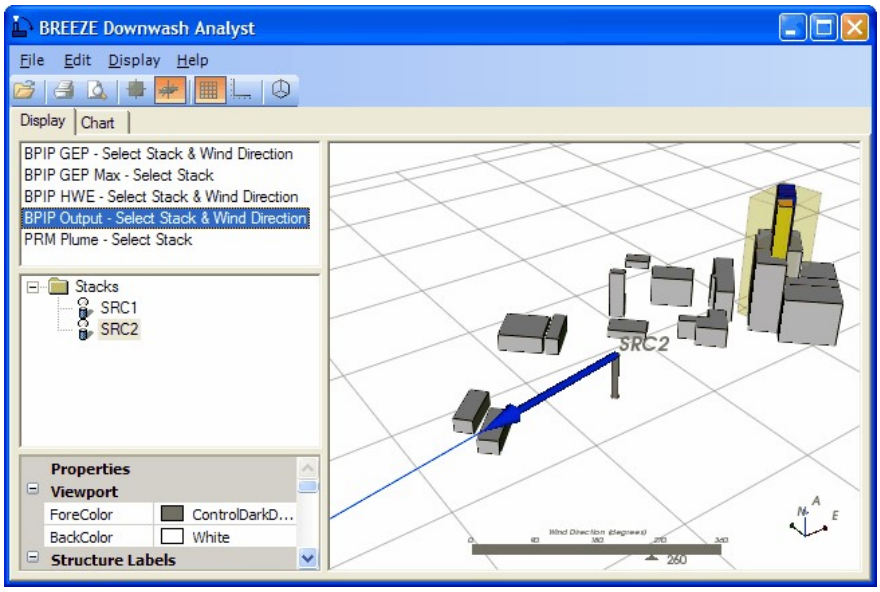
BPIP GEP Max - Select Stack - Displays the single-tier or tier-group, with it's GEP-SIZ, and the single wind direction that produces the maximum GEP height for a selected stack.



BPIP HWE - Select Stack & Wind Direction - Displays the single-tier or tier-group, with it's HWE-SIZ, that produces the maximum HWE for a selected stack and a selected wind direction.

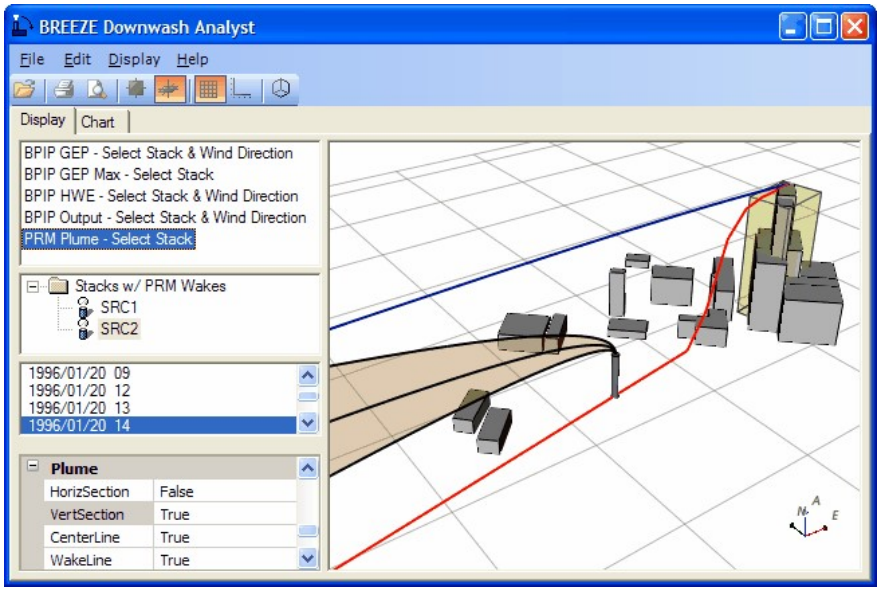


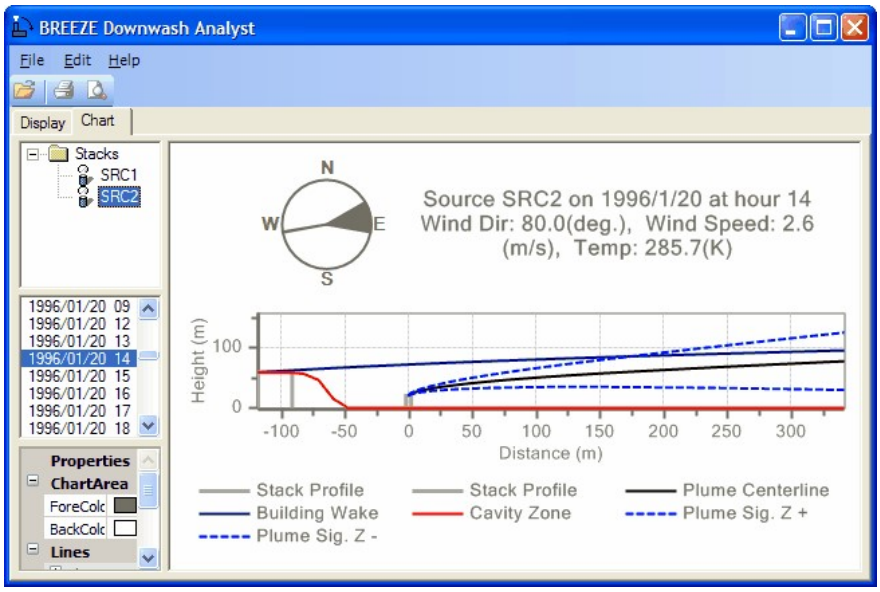
BPIP Output - Select Stack & Wind Direction - Displays the single-tier or tier-group that produces the maximum HWE and it's corresponding BPIPs (i.e. profile box with height, width, length, and X,Y offsets) for a selected stack and a selected wind direction. The single-tier or tier-group BPIPs are the BPIP output data that is subsequently used by the PRIME Plume Rise and Building Downwash Model.



PRIME Analysis Mode

PRM Plume - Select Stack & Time - Use BREEZE AERMOD to generate a PRIME plume downwash file (see the AERMOD | Input Menu | Output Options | Other File & Options). Load the file into Downwash Analyst to observe how the BPIP building profile parameters are used to generate the wake boundary, cavity boundary, and downwash-modified plume. Observe all hourly downwash (i.e. plume) geometry by selecting both a stack and a time, in either the 3D Display or the side-view Chart display.





Technical Background

Building Downwash

Building downwash is induced by building structures (i.e. tiers) located up-wind of point sources (i.e. stacks). As wind passes over structures, it first ascends up the front of the structure and then descends into a turbulent wake zone down-wind of the structure. The dispersion of emissions from short stacks, located in close proximity downwind of structures will be influenced (i.e. subjected to downwash effects) inside these structure-induced turbulence zones.

The EPA's Building Profile Input Program (BPIP)

The EPA's BPIP processor is used to compute maximum GEP (Good Engineering Practice) stack heights, the maximum HWE (Height of Wake Effect) values, and the BPIPs (Building Profile Input Parameters) for all combinations of single-tiers, tier-groups, stacks, and wind directions. Dispersion models then use the BPIPs (associated with each stack for 36 wind directions) to compute the plume downwash (i.e. adjusted plume center line and turbulent dispersion) downwind of tier-influenced stacks.

Good Engineering Practice (GEP) Stack Height for a Single Tier

BPIP first computes the GEP Stack Height for each stack. The GEP height for a stack with no tiers in it's vicinity is zero. The GEP for a stack with only one nearby tier is a function of the single tier's geometry and wind direction. For a single wind direction, the down-wind length of the single tier's GEP-SIZ (Structure Influence Zone) is the lesser of the structure's (i.e. the tier's) width or height times five (5L) . A stack located downwind, within the bounds of the tier's projected width and it's influence zone 5L length, should have a height (i.e. a GEP height) of 2.5 times the lesser of the tier's width or height, to effectively place the stack's emissions above (i.e. outside of) the tier's HWE.

For each single-tier, BPIP computes downwind GEP-SIZ geometry for 1440 wind directions (360 degrees in quarter degree increments). For each wind direction, BPIP determines if one or more stacks are located within the tier's GEP-SIZ and, if so, computes a GEP value for each such stack. BPIP iterates in this way for all combinations of single-tiers, stacks, and wind directions looking for the tier and wind direction that computes the highest GEP height for each stack.

Tier Groups - The Complex Part of BPIP

BPIP also recognizes that the wind can encounter multiple tiers before it reaches a stack. To accommodate this situation BPIP creates tier groups based on the relative geometry of neighboring tiers. It computes the minimum distance between all tiers and, for each of 1440 wind directions, it computes GEP-SIZ geometry for all combinations of "sufficiently close" tier groups, and again computes GEP values for all stacks within these tier-group GEP-SIZs. And to complicate things even further, BPIP iterates through all possible combinations of tiers-groups, computing different profile and GEP-SIZ geometry for tier-groups with different "focal-tiers" and "common-height-tiers". All things considered, BPIP performs an exhaustive process of locating stacks in all possible GEP-SIZs and computing all possible BPIPs that produce the maximum GEP height for each stack and wind direction.

Grouping Tiers into Buildings

Advanced user's will also be aware that BPIP allows tiers to be grouped into 'buildings'. Unfortunately, this is a widely misunderstood BPIP feature that often leads to modeling errors. Grouping tiers into a building accomplishes only one thing: it prevents BPIP from creating any of all the possible combinations of tier groups that would otherwise have been created using all the tiers that compose the building. It effectively accomplishes the opposite of what the novice modeler would expect: it prevents the tiers in a building from being grouped. So why group tiers into a building? One reason: it reduces the run time by reducing the number of tier group combinations.

There are important things to understand when using multi-tier buildings. A proper multi-tier building is composed of only tiers that are completely contained by the X-Y bounds of one of the tiers. It turns out that, in such a configuration, the maximum computed GEP and HWE values will always be determined by one, and only one, of the tiers in the building. Also, for those using BREEZE AERMOD, the 'elevation' of each tier must be the building elevation (i.e. the ground elevation). Do not set the elevation of a taller tier to be the roof-top elevation of a shorter tier.

Maximum Height of Wake Effect (HWE) and Building Profile Input Parameters (BPIPs)

After computing the maximum GEP stack heights, BPIP computes the BPIPs that produce the maximum HWE for each stack, in all wind directions (i.e. 36 wind directions in 10 degree increments). These values are written to the BPIP output file and subsequently used by the PRIME Plume Rise and Downwash Model within AERMOD. This second process uses information from the previous maximum GEP process, and is very similar in structure. The major differences are 1) larger HWE-SIZs, with a larger width (1/2L on both sides), an extended 2L up-wind boundary, and the same 5L downwind boundary, are used, and 2) only 36 wind directions, in 10 degree increments, are used. The same exhaustive process of computing HWE-SIZs for all single-tiers and tier-groups, locating stacks within the HWE-SIZs, and then computing an influence height (GEP in the first process and HWE in this second) is performed. The single-tier or tier-group BPIPs that produce the maximum HWE for each of the 36 wind directions is saved to the BPIP output file for each stack.

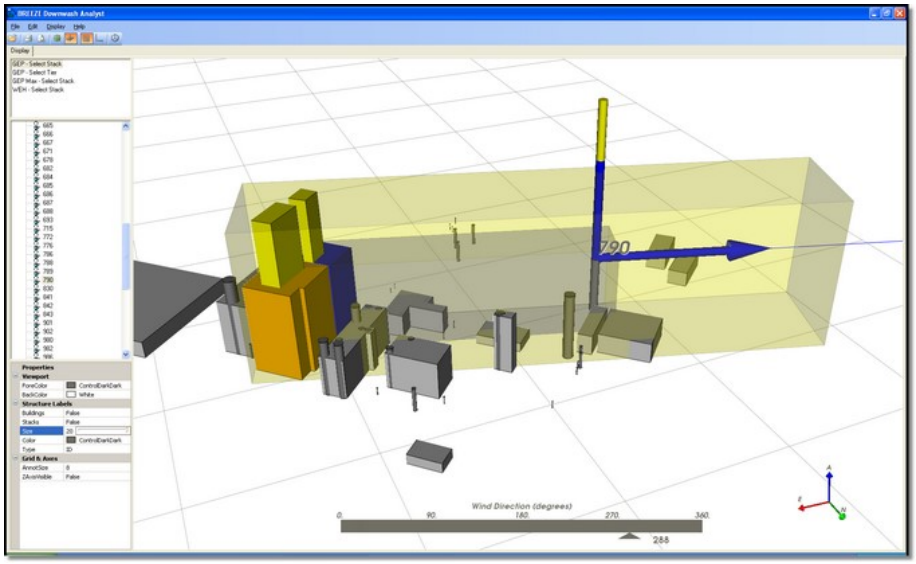
BREEZE Downwash Analyst - A Quick and Easy Way to Identify How Tiers Influence Stacks

Needless to say, the BPIP process becomes difficult to understand when numerous tiers and stacks are present in a model. The BREEZE Downwash Analyst is designed to visually display how 1) BPIP searches for tiers in the vicinity of stacks, 2) computes GEP-SIZ geometry, 3) identifies stacks within GEP-SIZs, 4) computes GEP heights, 5) computes HWE-SIZ geometry, 6) locates stacks within HWE-SIZs, 7) computes HWE values, and finally 8) saves the BPIPs for all wind

directions around each stack. BREEZE Downwash Analyst is designed to help modelers quickly and easily answer the following questions:

1. Which single tier, or tier group, most influences (i.e. produces the maximum GEP height for) a specific stack, for any given wind direction (see BPIP GEP - Select Stack & Wind Direction)?
2. What is the maximum stack GEP height for each stack (due to which single-tier or tier-group, and in what wind direction) (see BPIP GEP Max - Select Stack)?
3. Which single tier, or tier group, most influences (i.e. produces the maximum HWE for) a specific stack, for any given wind direction (see BPIP HWE - Select Stack & Wind Direction)?
4. What do the BPIPs for a specific stack look like and which single-tier or tier-group produced them for any given wind direction (see BPIP Output - Select Stack & Wind Direction)?

Looking at the BPIPs in a table cannot answer these questions. However, BREEZE Downwash Analyst can.

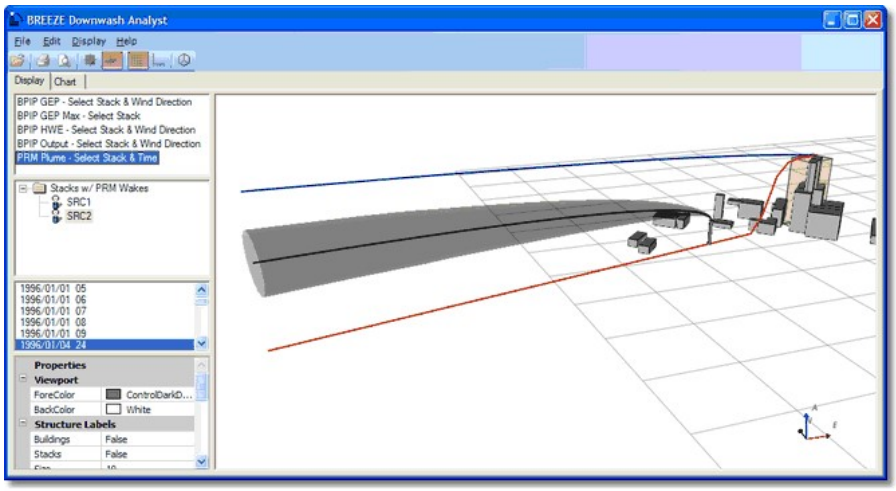


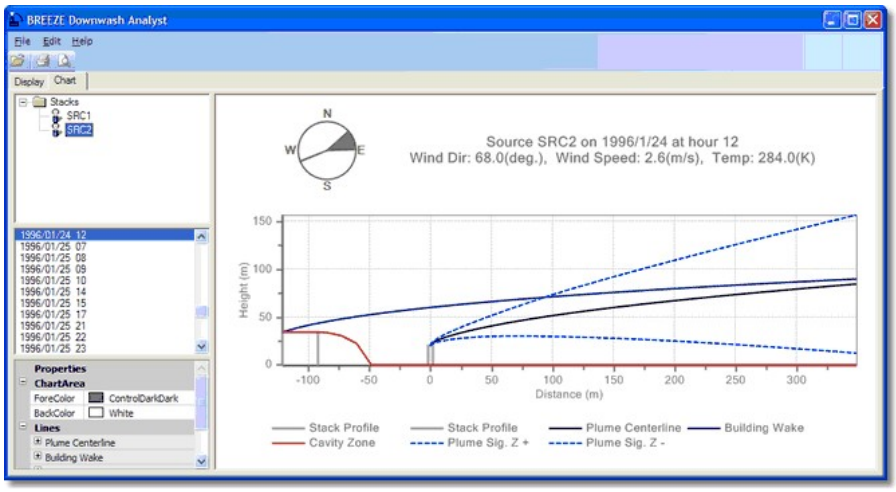
PRIME Plume Rise and Building Downwash Model

The BPIPs produced by running BPIP are used by the PRIME Plume Rise and Building downwash Model. The model modifies the plume center line, concentrations, and dispersion values to simulate the effects of turbulence in the 'cavity' and 'far wake' regions. Visit the EPA's SCRAM web site (http://www.epa.gov/scram001/) for more detailed information about the PRIME model.

BREEZE Downwash Analyst - A Quick and Easy Way to See Downwash-Influenced Plumes

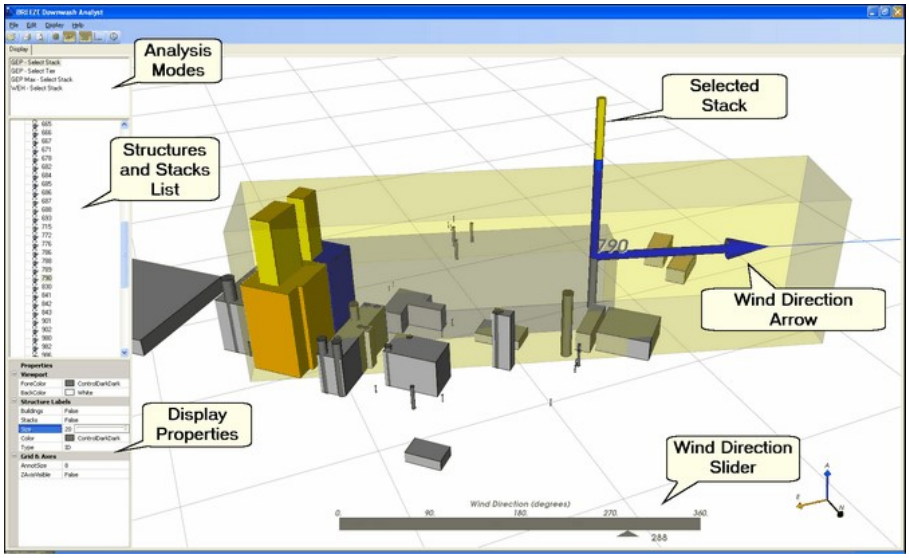
Downwash Analyst's fifth analysis mode, PRM Plume - Select Stack & Time, provides an easy way to observe the downwash plumes that are computed by AERMOD whenever the wind is blowing toward a stack in a direction that has non-zero BPIPs. To use this analysis mode, first run BREEZE AERMOD with the AERMOD_BREEZE_07026.exe (the 07026 designator might be a larger number as future versions of the executable are released by EPA) model and with the Input Menu | Output Options | Other File & Options | Generate Plume Downwash Centerline File option checked. This tells BREEZE AERMOD to generate an Aermod.prm file in the .amz results archive file. After the AERMOD Model Run, launch Downwash Analyst from the Tools Menu. Both the BPIP input data (i.e. the building and stack geometry) and the Aermod.prm data will be loaded into Downwash Analyst and all five analysis modes will be made available. Select the 'PRM Plume' analysis mode to see the AERMOD computed, downwash-influenced plume geometry with the BPIP geometry (i.e. building profile box), the near-wake (i.e. cavity) boundary, and the far-wake boundary. View this information in either the 3D Display or the side-view Chart display.



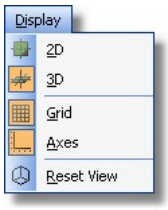


User Interface Basics

The BREEZE Downwash Analyst contains a 3D display viewer. There are no editing functions. Simply learn how to position the view, select an analysis mode, select a stack, and rotate the wind direction. There's nothing more to it... other than understanding what you're looking at.



Position the View



Display Menu

Tool Bar

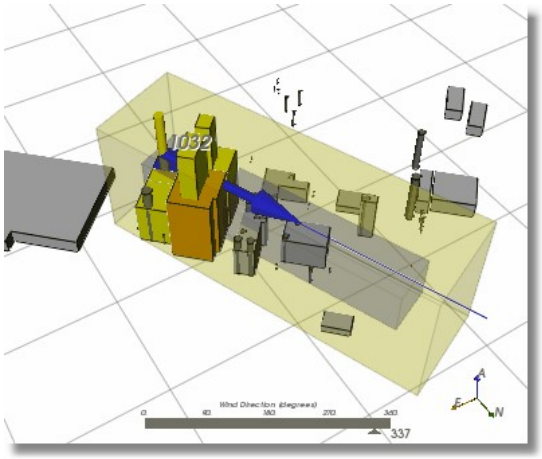
The Display Menu, and corresponding buttons on the Tool Bar provide the following toggle options:

	Toggle between top-down '2D' view or perspective '3D' viewing
	Toggle the grid lines and axes annotations on/off as desired
	Reset the view (i.e. center all objects in the view)

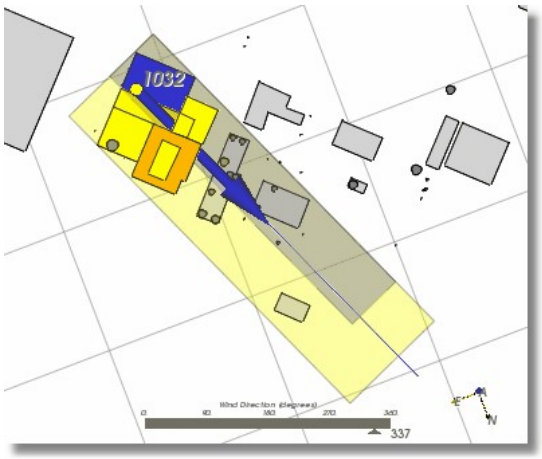
Use the mouse to **Rotate**, **Pan**, **Zoom**, and **Center** the view as follows:

Rotate	Left Mouse - Click down and drag up/down and left/right
Pan	Middle Mouse - Click down and drag up/down and left/right
Zoom	Right Mouse - Click down and drag up/down
Center	Center objects by Right Mouse clicking on the objects

Important: Use the **Center** function (i.e. click on objects with the right mouse button) to quickly pan, zoom-in, and set the center of rotation on a specific stack or tier.



Perspective 3D View



Top-down 2D View

Select Analysis Mode

Select one of the four viewing modes from the Analysis Modes list located in the upper left corner of the application. The following section describes the five Analysis Modes.

BPIP GEP - Select Stack & Wind Direction
BPIP GEP Max - Select Stack
BPIP HWE - Select Stack & Wind Direction
BPIP Output - Select Stack & Wind Direction
PRM Plume - Select Stack & Time

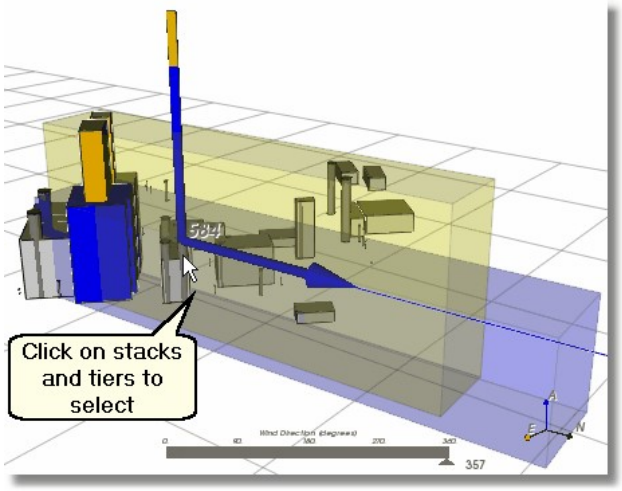
Analysis Mode Selection Box

1. BPIP GEP - Select Stack & Wind Direction - Displays the single-tier or tier-group, with it's GEP-SIZ, that produces the maximum GEP stack height for a selected stack and a selected wind direction.
2. BPIP GEP Max - Select Stack - Displays the single-tier or tier-group, with it's GEP-SIZ, and the single wind direction that produces the maximum GEP height for a selected stack.
3. BPIP HWE - Select Stack & Wind Direction - Displays the single-tier or tier-group, with it's HWE-SIZ, that produces the maximum HWE for a selected stack and a selected wind direction.
4. BPIP Output - Select Stack & Wind Direction - Displays the single-tier or tier-group that produces the maximum HWE and it's corresponding BPIPs (i.e. profile box with height, width, length, and X,Y offsets) for a selected stack and a selected wind direction.
5. PRM Plume - Select Stack & Time - Use BREEZE AERMOD to generate a PRIME plume downwash file (see the AERMOD | Input Menu | Output Options | Other File & Options). Load the file into Downwash Analyst to observe how the BPIP building profile parameters are used to generate the wake boundary, cavity boundary, and downwash-modified plume. Observe all hourly downwash (i.e. plume) geometry by selecting both a stack and a time, in either the 3D Display or the side-view Chart display.

Select a Stack

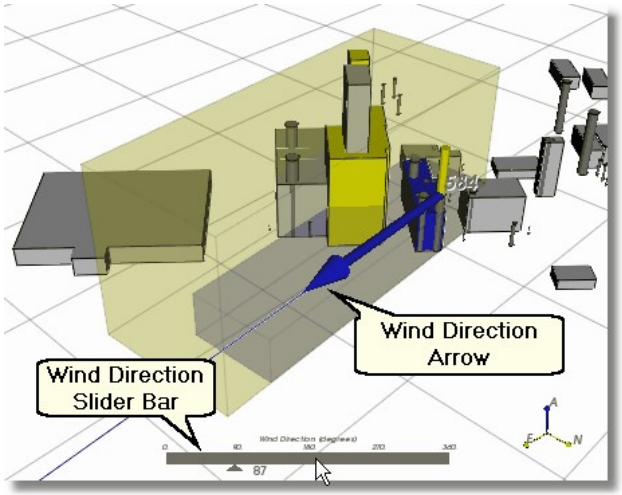
All five Anaysis Modes require the selection of a single stack. For example, the BPIP GEP - Select Stack & Wind Direction mode acts on one stack at a time. When you enter this mode the Stacks List displays a list of all stacks. Select a stack by either clicking directly on the stack in the the 3D window with the left mouse button or by

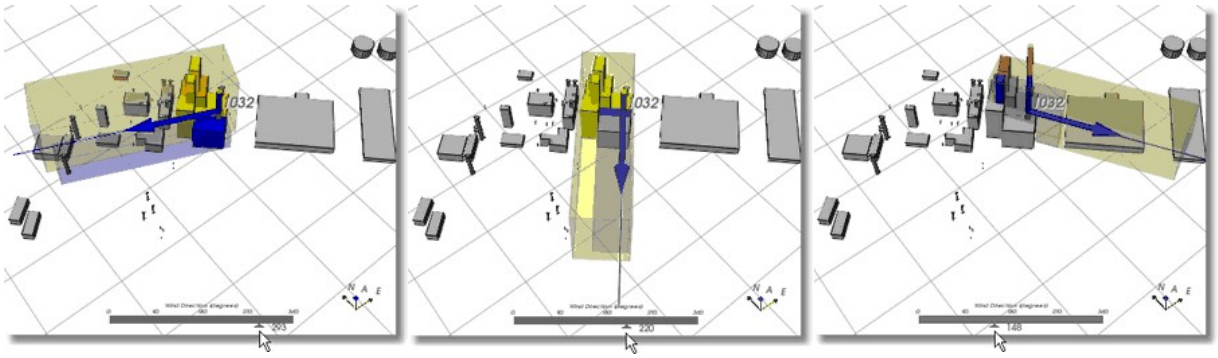
clicking on the name of the stack in the stack list.



Rotate the Wind Direction

Three of the five Analysis Modes involve rotating the wind direction around a selected stack. For example, in the BPIP GEP - Select Stack & Wind Direction mode a Wind Direction Slider Bar is displayed at the bottom of the 3D window and a wind direction arrow is displayed, projecting out from the top of the selected stack, in the direction of the current wind direction. Rotate the wind direction by clicking down with the left mouse button, anywhere on the Wind Direction Slider, and dragging the mouse left/right to rotate CW/CWW respectively.





Wind Direction = 293 degrees | Wind Direction = 220 degrees | Wind Direction = 148 degrees

Analysis Modes

BREEZE's Downwash Analyst provides five interactive visualization modes to help modelers better understand 1) how the EPA's BPIP processor computes the spatial relationships between multiple tiers and stacks (i.e. computes the BPIPs), and 2) how the BPIPs are used by AERMOD-PRIME to compute plume downwash.

Four BPIP Analysis Modes:

Question #1 - Which single tier, or tier group, most influences (i.e. produces the maximum GEP height for) a specific stack and a specific wind direction?

Answer - BPIP GEP - Select Stack & Wind Direction - Displays the single-tier or tier-group, with it's GEP-SIZ, that produces the maximum GEP stack height for

a selected stack and a selected wind direction.

Question #2 - What is the maximum stack GEP height for each stack (due to which single-tier or tier-group, and in what wind direction)?

Answer - BPIP GEP Max - Select Stack - Displays the single-tier or tier-group, with it's GEP-SIZ, and the single wind direction that produces the maximum GEP height for a selected stack.

Question #3 - Which single tier, or tier group, most influences (i.e. produces the maximum HWE for) a specific stack and a specific wind direction ?

Answer - BPIP HWE - Select Stack & Wind Direction - Displays the single-tier or tier-group, with it's HWE-SIZ, that produces the maximum HWE for a selected stack and a selected wind direction.

Question #4 - What do the BPIPs for a specific stack and a specific wind direction look like and were they produced from a single-tier or tier-group?

Answer - BPIP Output - Select Stack & Wind Direction - Displays the single-tier or tier-group that produces the maximum HWE and it's corresponding BPIPs (i.e. profile box with height, width, length, and X,Y offsets) for a selected stack and a selected wind direction.

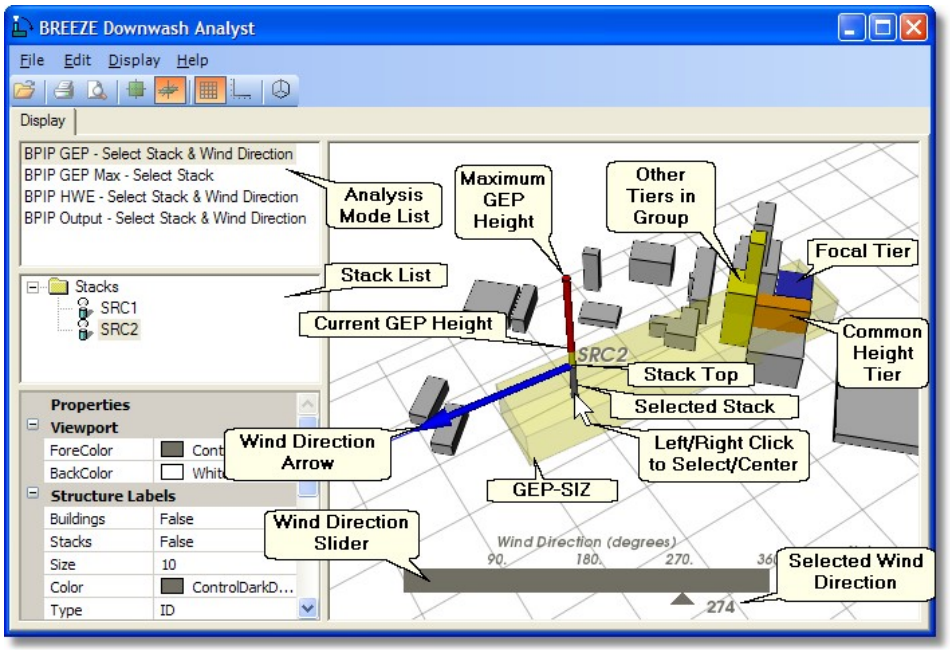
PRIME Plume Downwash Analysis Mode:

Question #5 - What does the downwash-affected plume produced by the AERMOD-PRIME model look like relative to the BPIP building profile parameters and the shape of the building cavity and far-wake boundaries?

Answer - PRM Plume - Select Stack & Time - Use BREEZE AERMOD to generate a PRIME plume downwash file (see the AERMOD | Input Menu | Output Options | Other File & Options). Load the file into Downwash Analyst to observe how the BPIP building profile parameters are used to generate the wake boundary, cavity boundary, and downwash-modified plume. Observe all hourly downwash (i.e. plume) geometry by selecting both a stack and a time, in either the 3D Display or the side-view Chart display.

BPIP GEP - Select Stack & Wind Direction

The BPIP GEP analysis mode is used to quickly identify all the single-tiers and tier-groups that are close enough to influence a stack.



- Select the mode by clicking on "BPIP GEP - Select Stack & Wind Direction" in the Mode List.
- Select a stack by either clicking on it's name in the Stack List or directly clicking on the 3D stack with the left mouse button. Notice how the Wind Direction Arrow appears pointing out from the Stack Top.
- Center the stack in the view by positioning the cursor on the stack and clicking the right mouse button. Rotate the view by clicking down with the left mouse button and dragging the mouse left/right and up/down.
- Rotate the wind direction by clicking down with the left mouse button, anywhere on the Wind Direction Slider, and dragging the mouse left/right to rotate CW/CWW respectively. Notice how the Wind Direction Arrow rotates around the stack, pointing in the Selected Wind Direction.
- Notice what happens while rotating the wind direction:

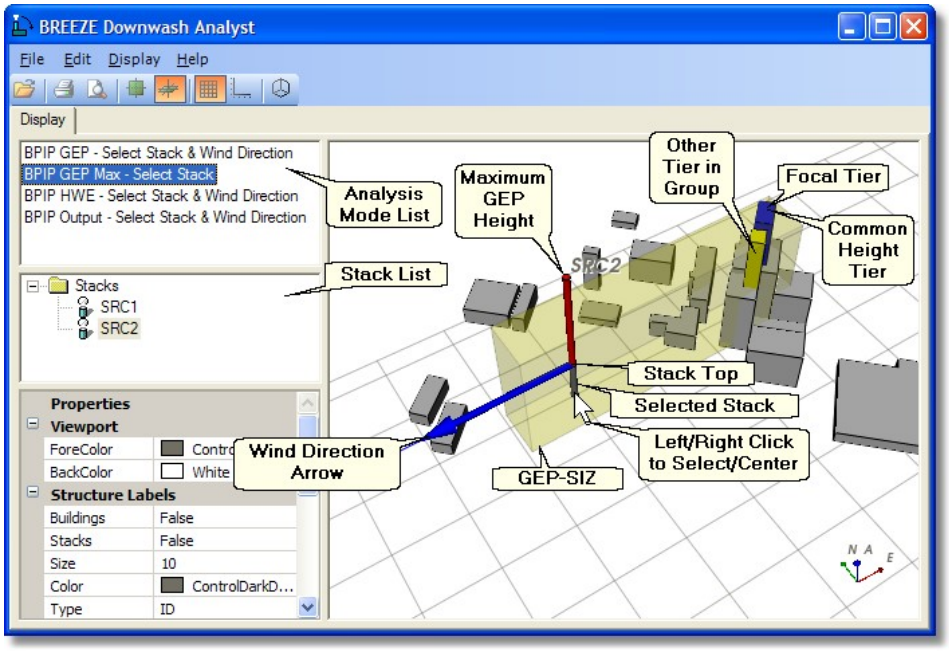
1. Anytime the stack is found to be within one or more GEP-SIZs, the single-tier or tier-group that produces the highest GEP value will be displayed and highlighted with a combination of three colors: blue, orange, and yellow. A single-tier will be blue. A tier-group will have a Focal Tier colored blue, a Common Height Tier colored orange, and additional Other Tiers colored yellow. If a tier-group has only a single blue tier with one or more yellow tiers then the Focal Tier is also the Common Height Tier.
2. The associated GEP-SIZ will be displayed in either yellow or blue. Blue if the GEP-SIZ is for a single-tier and yellow if the GEP-SIZ is for a tier-group. Notice that the cross-wind width of the GEP-SIZ is exactly equal to the profile width of the influencing structure (i.e. the single-tier or tier-group). Notice that the length of the GEP-SIZ extends '5L' (where 'L' is the lesser of the influencing structures height or width) past the downwind boundary of the influencing structure.
3. The computed GEP Height will be displayed as a yellow or blue cylinder on top of the Selected Stack cylinder. The GEP Height cylinder will be blue if it is produced by a single-tier and yellow if it is produced by a tier-group.
4. Notice how the tiers in a tier-group move up and down vertically to align their bases with the Focal Tier. This is necessary to demonstrate that BPIP does not use tier elevation values when combining tiers into groups. All tiers are assumed to have the same base elevation as the Focal Tier.

5. Notice that the height of the GEP-SIZ block is always equal to the height of the Common Height Tier and that the GEP Height will be "1.5 times the lesser of the GEP-SIZs height or width" above the top of the GEP-SIZ block. This is, in fact, how GEP height is calculated.

- To automatically rotate the Wind Direction and the view direction hit the "Z" key. Hit the 'Z' key again to stop the Automatic Rotation Mode. This 'animation' mode is very useful for observing the GEP height results for all wind directions. Notice that you can perform all other interactions while in Automatic Rotation Mode. Right mouse click on other objects to reset the center of rotation. Pan the scene by clicking down with the middle mouse button and dragging left/right and up/down. Click on another stack, or click on another stack in the Stack List, to select another stack. Even change the analysis mode by clicking on another selection in the Analysis Mode List.
- Use the Display Menu, or Toolbar Buttons to toggle between the 3D and 2D top-down views. Notice in the top-down view how perspective distortion is removed making it easy to see the GEP-SIZ boundaries. Also, use the Display Menu or Toolbar Buttons to toggle the Axes and Grid display On/Off, and to Reset View (i.e. center the entire scene into view).

BPIP GEP Max - Select Stack

The BPIP GEP Max analysis mode is used to display the single-tier or tier-group, with it's corresponding GEP-SIZ and Wind Direction, that produces the maximum GEP height for a Selected Stack.



- Select the mode by clicking on "BPIP GEP Max - Select Stack" in the Mode List.
- Select a stack by either clicking on it's name in the Stack List or directly clicking on the 3D stack with the left mouse button. Notice how the Wind Direction Arrow appears pointing out from the Stack Top. This is the direction that produces the Maximum GEP Height for the Selected Stack.
- Center the stack in the view by positioning the cursor on the stack and clicking the right mouse button. Rotate the view by clicking down with the left mouse button and dragging the mouse left/right and up/down.
- Notice what is displayed after selecting a stack:

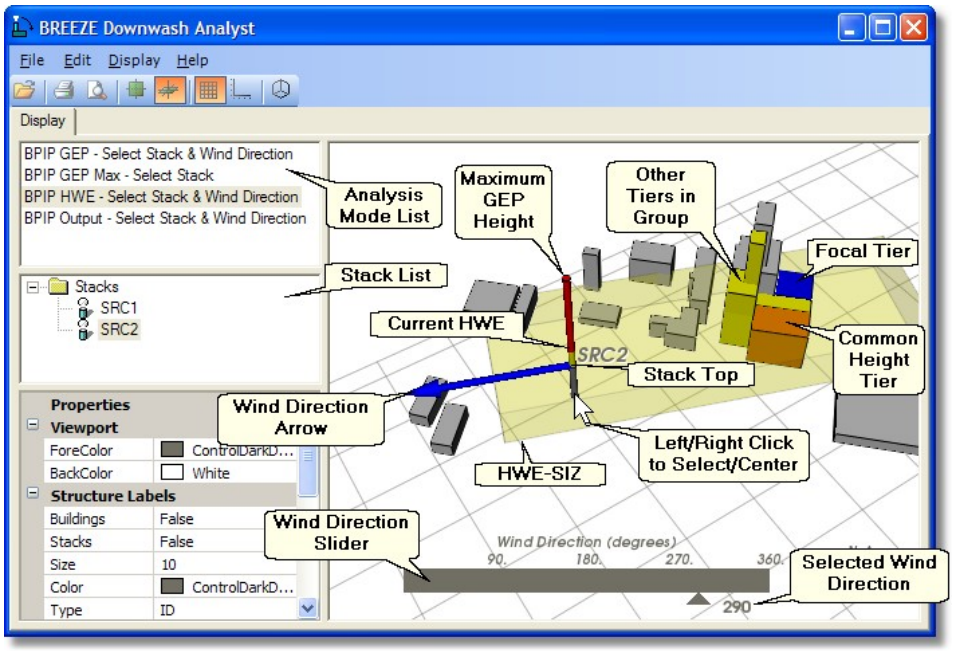
1. The single-tier or tier-group that produces the Maxim GEP Height will be highlighted with a combination of three colors: blue, orange, and yellow. A single-tier will be blue. A tier-group will have a Focal Tier colored blue, a Common Height Tier colored orange, and additional Other Tiers colored yellow. If a tier-group has only a single blue tier with one or more yellow tiers then the Focal Tier is also the Common Height Tier.
2. The associated GEP-SIZ will be displayed in either yellow or blue. Blue if the GEP-SIZ is for a single-tier and yellow if the GEP-SIZ is for a tier-group. Notice that the width of the GEP-SIZ is exactly equal to the profile width of the influencing structure (i.e. the single-tier or tier-group). Notice that the length of the GEP-SIZ extends '5L' (where 'L' is the lesser of the influencing structures height or width) past the downwind boundary of the influencing structure.
3. The computed Maximum GEP Height will be displayed as a red cylinder on top of the Selected Stack cylinder. If the Maximum GEP Height is higher than the Selected Stack, then the stack is too short and will be subjected to downwash effects in the wake of the influencing structure. If the Selected Stack is higher than the Maximum GEP Height, then the stack emissions will be above the influence (i.e. outside the turbulent wake) of the influencing structure.
4. Notice how the tiers in a tier-group might have moved up or down vertically to align their bases with the Focal Tier. This is necessary to demonstrate that BPIP does not use tier elevation values when combining tiers into groups. All tiers are assumed to have the same base elevation as the Focal Tier.
5. Notice that the height of the GEP-SIZ block is always equal to the height of the Common Height Tier and that the GEP Height will be "1.5 times the lesser of the GEP-SIZs height or width" above the top of the GEP-SIZ block. This is, in fact, how GEP height is calculated.

- To automatically rotate the view direction hit the "Z" key. Hit the 'Z' key again to stop the Automatic Rotation Mode. Notice that you can perform all other interactions while in Automatic Rotation Mode. Right mouse click on other objects to reset the center of rotation. Pan the scene by clicking down with the middle mouse button and dragging left/right and up/down. Select another stack by clicking on another stack in the view, or clicking on another stack in the Stack List. Even change the analysis mode by clicking on another selection in the Analysis Mode List.
- Use the Display Menu, or Toolbar Buttons to toggle between the 3D and 2D top-down views. Notice in the top-down view how perspective distortion is removed making it easy to see the GEP-SIZ boundaries. Also, use the Display Menu or Toolbar Buttons to toggle the Axes and Grid display On/Off, and to Reset View (i.e. center the entire scene into view).

BPIP HWE - Select Stack & Wind Direction

The BPIP HWE analysis mode is used to display the single-tier or tier-group, with it's corresponding HWE-SIZ, that produces the maximum HWE height for a Selected Stack and a selected Wind Direction. The projected profile dimensions (i.e. height, cross-wind width, down-wind length, and XY offsets) of the single-tier or tier-group that produce each maximum HWE, for each wind direction (36 directions in 10 degree increments), are, in fact, the BPIP output values (i.e. the Build Profile Input Parameters)

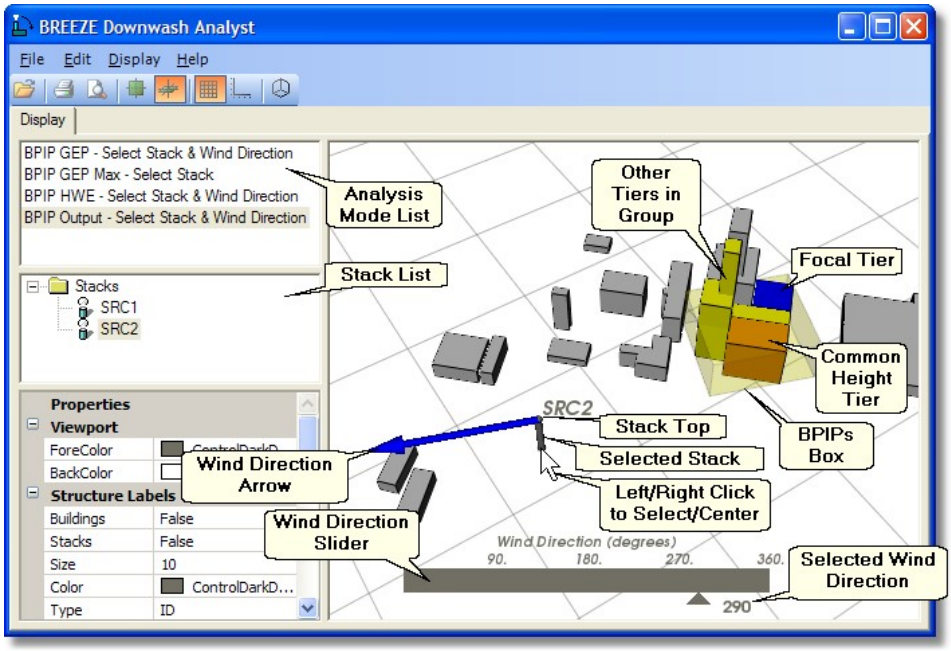
used by the Prime Plume Rise and Building Downwash Model. See the BPIP Output analysis mode to see exactly what the BPIPs look like for each wind direction around each stack.



- Select the mode by clicking on "BPIP HWE - Select Stack & Wind Direction" in the Mode List.
- Select a stack by either clicking on it's name in the Stack List or directly clicking on the 3D stack with the left mouse button. Notice how the Wind Direction Arrow appears pointing out from the Stack Top.
- Center the stack in the view by positioning the cursor on the stack and clicking the right mouse button. Rotate the view by clicking down with the left mouse button and dragging the mouse left/right and up/down.
- Rotate the wind direction by clicking down with the left mouse button, anywhere on the Wind Direction Slider, and dragging the mouse left/right to rotate CW/CWW respectively. Notice how the Wind Direction Arrow rotates around the stack, in 10 degree increments, pointing in the Selected Wind Direction.
- Notice what happens while rotating the wind direction:
    1. Anytime the stack is found to be within one or more HWE-SIZs, the single-tier or tier-group that produces the highest HWE value will be displayed and highlighted with a combination of three colors: blue, orange, and yellow. A single-tier will be blue. A tier-group will have a Focal Tier colored blue, a Common Height Tier colored orange, and additional Other Tiers colored yellow. If a tier-group has only a single blue tier with one or more yellow tiers then the Focal Tier is also the Common Height Tier.
    2. The associated HWE-SIZ will be displayed in either yellow or blue. Blue if the HWE-SIZ is for a single-tier and yellow if the HWE-SIZ is for a tier-group. Notice that the HWE-SIZ is larger than a GEP-SIZ with a cross-wind width equal to the profile width of the influencing structure (i.e. the single-tier or tier-group) with an additional 1/2L (where 'L' is the lesser of the influencing structures height or width) on both sides. Notice that the length of the HWE-SIZ extends '2L' in front of the upwind boundary of the influencing structure and '5L' past the downwind boundary of the influencing structure.
    3. The computed HWE will be displayed as a yellow or blue cylinder on top of the Selected Stack cylinder. The HWE cylinder will be blue if it is produced by a single-tier and yellow if it is produced by a tier-group.
    4. Notice how the tiers in a tier-group move up and down vertically to align their bases with the Focal Tier. This is necessary to demonstrate that BPIP does not use tier elevation values when combining tiers into groups. All tiers are assumed to have the same base elevation as the Focal Tier.
    5. Notice that the height of the HWE-SIZ block is always equal to the height of the Common Height Tier and that the HWE will be "1.5 times the lesser of the HWE-SIZs height or the influencing structures across-wind width" above the top of the HWE-SIZ block. This is, in fact, how HWE is calculated.
- To automatically rotate the Wind Direction and the view direction hit the "Z" key. Hit the 'Z' key again to stop the Automatic Rotation Mode. This 'animation' mode is very useful for observing the HWE results for all wind directions around the Selected Stack. Notice that you can perform all other interactions while in Automatic Rotation Mode. Right mouse click on other objects to reset the center of rotation. Pan the scene by clicking down with the middle mouse button and dragging left/right and up/down. Click on another stack, or click on another stack in the Stack List, to select another stack. Even change the analysis mode by clicking on another selection in the Analysis Mode List.
- Use the Display Menu, or Toolbar Buttons to toggle between the 3D and 2D top-down views. Notice in the top-down view how perspective distortion is removed making it easy to see the HWE-SIZ boundaries. Also, use the Display Menu or Toolbar Buttons to toggle the Axes and Grid display On/Off, and to Reset View (i.e. center the entire scene into view).

BPIP Output - Select Stack & Wind Direction

The BPIP Output analysis mode is used to display the single-tier or tier-group, with it's corresponding BPIPs Box (Building Profile Input Parameters Box including the Common Tier height, cross-wind structure width, along-wind structure length, and XY offsets from the stack XY center) for a Selected Stack and a selected Wind Direction (36 directions in 10 degree increments). The BPIPs box is, in fact, the BPIP output values used by the Prime Plume Rise and Building Downwash Model.



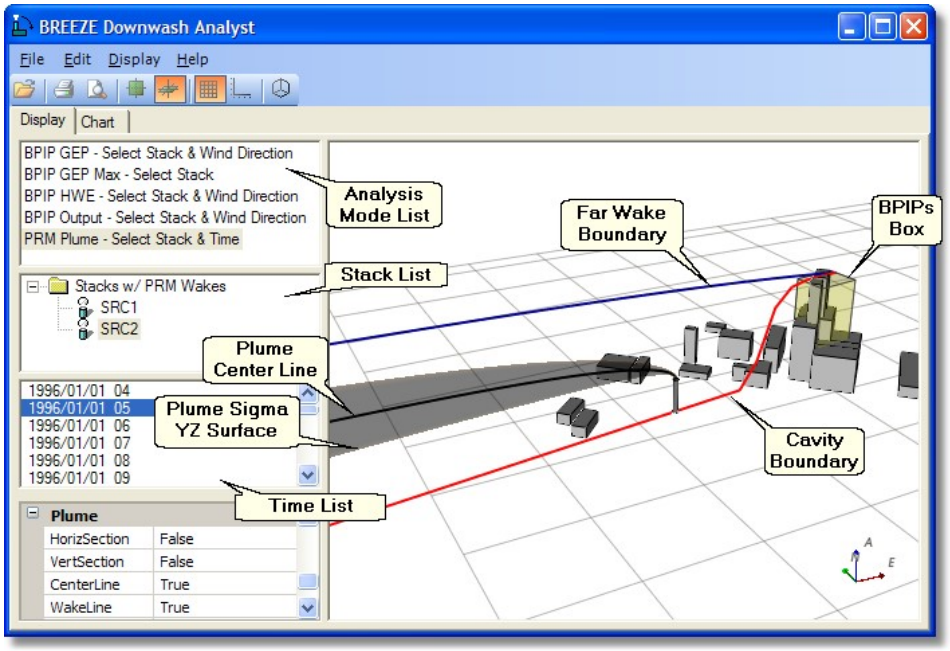
- Select the mode by clicking on "BPIP Output - Select Stack & Wind Direction" in the Mode List. Notice that all the stacks and tiers are shifted vertically down to the bottom plane. This is necessary to demonstrate that the BPIPs produced by BPIPPRM do not retain any information of about relative elevations between stacks and tiers. The PRIME Plume Rise and Building Downwash Model assumes that the elevation of a stack's BPIPs is the same as the stack's elevation.
- Select a stack by either clicking on it's name in the Stack List or directly clicking on the 3D stack with the left mouse button. Notice how the Wind Direction Arrow appears pointing out from the Stack Top.
- Center the stack in the view by positioning the cursor on the stack and clicking the right mouse button. Rotate the view by clicking down with the left mouse button and dragging the mouse left/right and up/down.
- Rotate the wind direction by clicking down with the left mouse button, anywhere on the Wind Direction Slider, and dragging the mouse left/right to rotate CW/CWW respectively. Notice how the Wind Direction Arrow rotates around the stack, in 10 degree increments, pointing in the Selected Wind Direction.
- Notice what happens while rotating the wind direction:
    1. The single-tier or tier-group that produces the highest HWE value for the Selected Wind Direction will be displayed and highlighted with a combination of three colors: blue, orange, and yellow. A single-tier will be blue. A tier-group will have a Focal Tier colored blue, a Common Height Tier colored orange, and additional Other Tiers colored yellow. If a tier-group has only a single blue tier with one or more yellow tiers then the Focal Tier is also the Common Height Tier.
    2. The associated BPIPs Box, for the Selected Wind Direction, will be displayed in yellow. The BPIPs box is, in fact, the BPIP output values used by the Prime Plume Rise and Building Downwash Model. Notice how the BPIPs Box includes the Common Tier height, cross-wind influencing-structure width, along-wind influencing-structure length, and XY offsets from the stack XY center
    3. Notice that the height of the BPIPs Box is always equal to the height of the Common Height Tier.
- To automatically rotate the Wind Direction and the view direction hit the "Z" key. Hit the 'Z' key again to stop the Automatic Rotation Mode. This 'animation' mode is very useful for observing the BPIPs Boxs for all wind directions around the Selected Stack. Notice that you can perform all other interactions while in Automatic Rotation Mode. Right mouse click on other objects to reset the center of rotation. Pan the scene by clicking down with the middle mouse button and dragging left/right and up/down. Click on another stack, or click on another stack in the Stack List, to select another stack. Even change the analysis mode by clicking on another selection in the Analysis Mode List.
- Use the Display Menu, or Toolbar Buttons to toggle between the 3D and 2D top-down views. Notice in the top-down view how perspective distortion is removed making it easy to see the boundaries of the BPIPs Box. Also, use the Display Menu or Toolbar Buttons to toggle the Axes and Grid display On/Off, and to Reset View (i.e. center the entire scene into view).

PRM Plume - Select Stack & Time

The PRM Plume analysis mode is used to display results produced by the PRIME Plume Rise and Building Downwash Model when running BREEZE AERMOD 6. Observe the downwash plumes that are computed by AERMOD whenever the wind is blowing toward a stack in a direction that has non-zero BPIPs.

To use this analysis mode, first run BREEZE AERMOD with the AERMOD_BREEZE_07026.exe (the 07026 designator might be a larger number as future versions of the executable are released by EPA) model and with the Input Menu | Output Options | Other File & Options | Generate Plume Downwash Centerline File option checked. This tells BREEZE AERMOD to generate an Aermod.prm file in the .amz results archive file. After the AERMOD Model Run, launch Downwash Analyst from the Tools Menu. Both the BPIP input data (i.e. the building and stack geometry) and the Aermod.prm data will be loaded into Downwash Analyst. Note: the PRM Plume analysis mode is made available only when an Aermod.prm file is found in the .amz file.

Select the 'PRM Plume' analysis mode to see the AERMOD computed, downwash-influenced plume geometry with the BPIPs Box (Building Profile Input Parameters Box including the Common Tier height, cross-wind structure width, along-wind structure length, and XY offsets from the stack XY center), the Cavity (i.e. near-wake) Boundary, and the Far-Wake Boundary. View this information in either the 3D Display or the side-view Chart display.



- Select the mode by clicking on "PRM Plume - Select Stack & Time" in the Mode List. Notice that all the stacks and tiers are shifted vertically down to the bottom plane. This is necessary to demonstrate that the BPIPs produced by BPIPPRM and the Plume Geometry does not contain any information of about relative elevations between stacks and tiers. The PRIME Plume Rise and Building Downwash Model assumes that the elevation of a stack's BPIPs and Plume Geometry are the same as the stack's elevation.
- Select a stack by either clicking on it's name in the Stack List or directly clicking on the 3D stack with the left mouse button.
- Select a date-hour value from the Time List. Use the arrow keys on the keyboard to step up/down through the list to observe the time-sequenced downwash data. Notice how every selected time will display a plume with it's associated BPIPs Box and wake lines. This is because the BREEZE Aermod model only outputs information to the Aermod.prm file when the wind direction is such that a stack has BPIP values and, subsequently, the PRIME Downwash Model is executed.
- Center the stack in the view by positioning the cursor on the stack and clicking the right mouse button. Rotate the view by clicking down with the left mouse button and dragging the mouse left/right and up/down.
- Notice that the wind directions for the plume data is not restricted to 10 degree increments. Notice what happens as the Selected Time, and subsequently the wind direction, changes:
    1. The plume and wake geometry changes due to changes in the BPIPs geometry and the meteorological conditions.
    2. The associated BPIPs Box, for the Selected Time, will shift with the plume direction. The BPIPs box is, in fact, the BPIP values written to the Aermod.prm file by the Prime Plume Rise and Building Downwash Model. Notice how the BPIPs Box will shift slightly from it's original position for Wind Directions that are not increments of 10. This effect is easier to observe using the top-down 2D viewing mode (select '2D' from the display menu or toolbar).
- To automatically rotate the view direction and step through the Time List hit the "Z" key. Hit the 'Z' key again to stop the Automatic Rotation Mode. This 'animation' mode is very useful for observing the PRIME Plumes (i.e. all plumes in the Time List) produced for the Selected Stack. Notice that you can perform all other interactions while in Automatic Rotation Mode. Right mouse click on other objects to reset the center of rotation. Pan the scene by clicking down with the middle mouse button and dragging left/right and up/down. Click on another stack, or click on another stack in the Stack List, to select another stack. Click in the time list to change the Time. Even change the analysis mode by clicking on another selection in the Analysis Mode List.
- Use the Display Menu, or Toolbar Buttons to toggle between the 3D and 2D top-down views. Notice in the top-down view how perspective distortion is removed making it easy to see the boundaries of the BPIPs Boxes and the Plume Sigma Y boundaries. Also, use the Display Menu or Toolbar Buttons to toggle the Axes and Grid display On/Off, and to Reset View (i.e. center the entire scene into view).

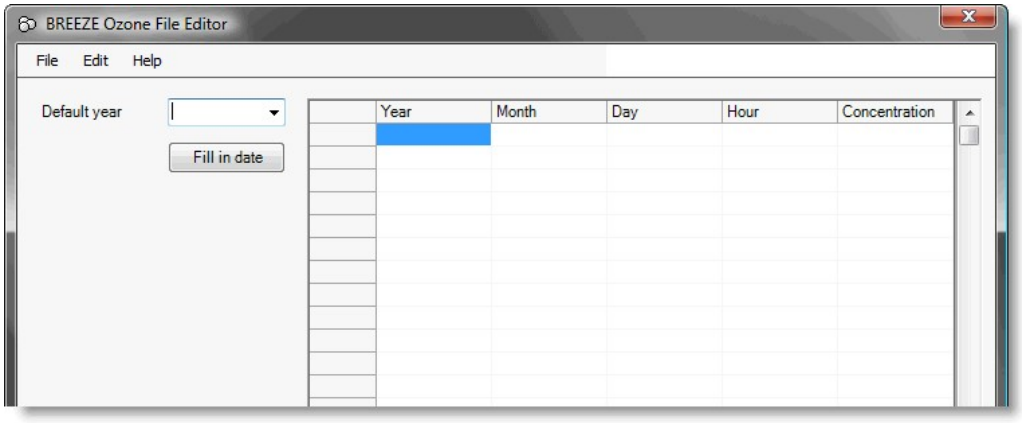
Ozone File Editor

NOTE: This utility is **only available in the Professional version** of BREEZE AERMOD/ISC. To upgrade your version, contact us.

The BREEZE Ozone File Editor allows the user to create, view, and edit hourly zone files for use in the Ozone Limiting Method (OLM). Since the OLM Model is a non-guideline model, the ARM/OLM Workgroup recommends that the permitting agency be contacted to obtain approval for its use in an air permit application.

Starting the Ozone File Editor

From the Tools menu, select the *Ozone File Editor* menu item. The following utility application will be displayed:



Creating a new ozone file

To create a new ozone file, do the following:

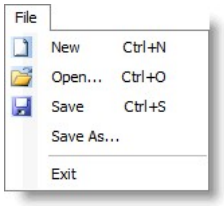
1. Select the desired year in the drop down list. The year must be identical to that in the meteorological data file that you will be utilizing in your model run.
2. Click the *Fill in date* button.

   The table will be populated with the year, month, day and hours values for the entire year. The *Concentration* column will be set to zero by default. The *Concentration* fields should be set to the actual ozone concentration values for that particular hour.

   The Edit menu provides the common functionality of editing. You can copy and paste data just as you would in a spreadsheet. Choose copy or paste from the Edit menu. You can also use ctrl+C and ctrl+V as hot keys to perform the same operations.

Saving an ozone file

Click menu File | Save or menu File | Save As.. or press ctrl+S.



Type the file name in the File Name list box and select *Save*. You then have a file that can be referenced under Control Options | Ozone Tab.

Hourly Emission File Editor

NOTE: This utility is **only available in the Professional version** of BREEZE AERMOD/ISC. To upgrade your version, contact us.

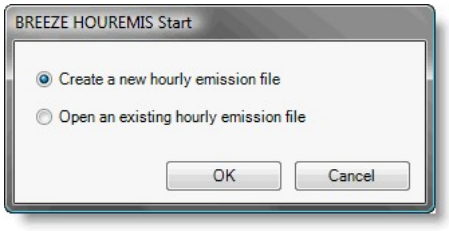
The BREEZE Hourly Emission File Editor allows the user to create, view, and edit hourly emission files for their sources. It is possible to specify an emission rate for each source and each hour of the year in a particular scenario, but not required.

- When using the 07026 AERMOD executable, point source exit temperatures and exit velocities may vary as well.
- When using the 09292 AERMOD executable:
  - point source exit temperatures and exit velocities may vary
  - area source release heights and initial vertical dispersion parameters may vary
  - volume source release heights, initial vertical dispersion parameters, and initial lateral dispersion parameters may vary

Starting the Hourly Emission File Editor

Model Keyword: HOUREMIS

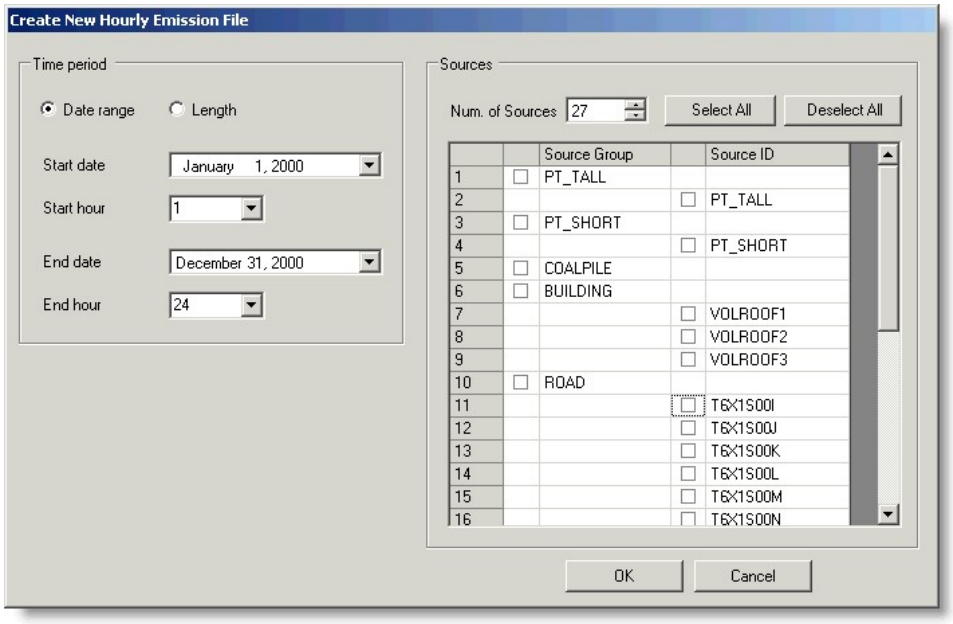
From the Project Tools menu, select the *Hourly Emission Editor* menu item. The following form will prompt you to either create a new hourly emission file (an external ASCII file) or to open an existing file. Clicking the "Cancel" button will start the editor without either an existing file being opened or a new file created.



Another way to create a new hourly emission file or open an existing file is from the file menu or the buttons on the tool bar within the editor.

Creating a New File

The first step in creating a **new** hourly emission file is to provide information about the time period and sources that the emission data is valid. The following form will be displayed requesting this information. After the necessary data has been entered into the form, press the OK button. The form will close and a table pre-populated with Source IDs will be displayed.



Time period

The data in the hourly emission file must include the exact same dates as are included in the meteorological input files, and the source IDs must correspond to the source IDs defined in the project scenario's input file and be in the same order.

Multiple records are required to define the emissions for one hour if more than one source is referenced. The AERMOD model will check for a date mismatch between the hourly emissions file and the meteorological data. It is not necessary, however, to process the entire hourly emissions file on each model run, i.e., the correct emissions data will be read if the user specifies a meteorological period subset, as long as all the dates (including those that are processed and those that are skipped) match the meteorological data files.

Date range: Choose this option to specify the start and end date and hours of the hourly emission file.

Length: Choose this option to specify the the number of hours that the hourly emission file will contain.

Start date: Select the date that the hourly emission file should begin with.

Start hour: Select the hour that the hourly emission file should begin with.

End date: Only displayed when the *Date range* option is selected. Select the date that the hourly emission file should end with.

End hour: Only displayed when the *Date range* option is selected. Select the hour that the hourly emission file should end with.

Total hours: Only displayed when the *Length* option is selected. Specify the total number of hours that the emission file will contain.

Sources

The AERMOD model will check for a source ID mismatch between what is in the project scenario input file and the hourly emission file. If the two files done match up exactly, the model will not complete successfully.

Number of sources: Enter the number of sources that will be included the hourly emission file.

Source Group: If sources have already been grouped, the source groups and the associated sources will be identified in the table. Checking the box of a source group will select all the sources in a group.

Source ID: Sources will be identified in the Source ID column. Place a checkmark in the box of each source to add it to the hourly emissions table.

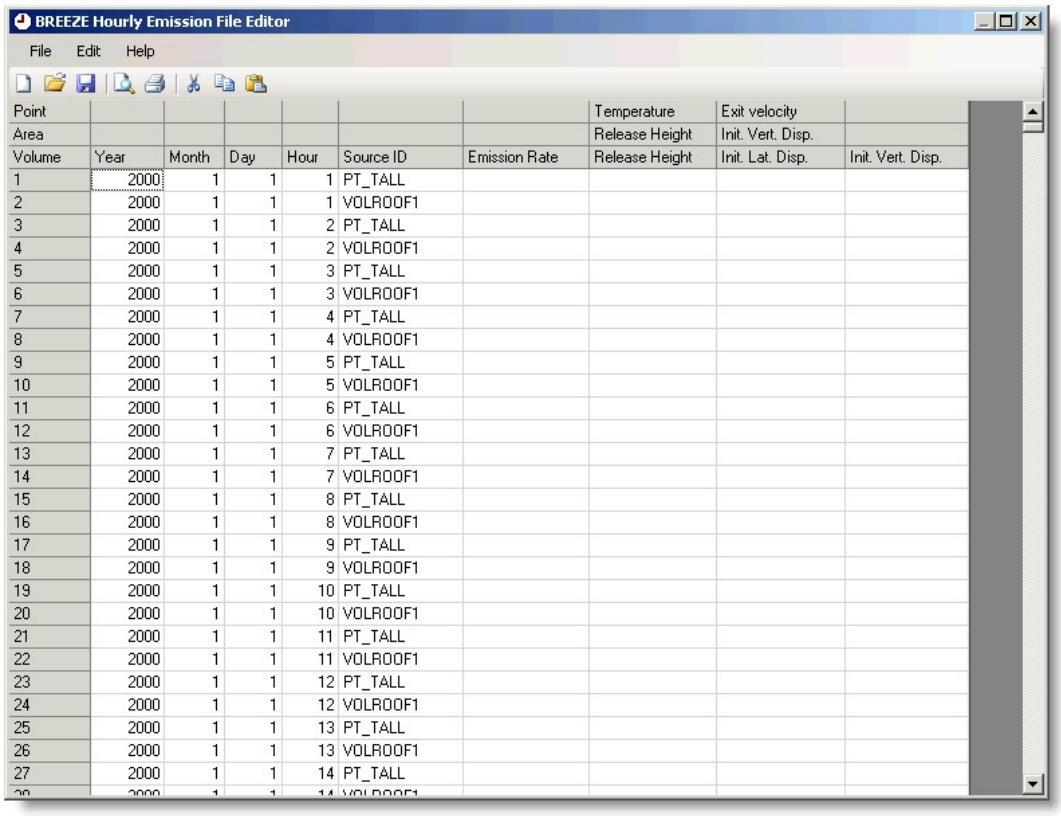
Editing Hourly Emissions

After a new hourly emission file is created, an emission rate table will be displayed that can be updated with the appropriate emission data. The Year, Month, Day, Hour and Source ID are filled automatically.

Enter an emission rate for each hour and source. The other parameters to modify depend upon source type based on the header rows:

- Point sources: Modify the Temperature (K) and Exit velocity (m/s)
- Area sources: Modify the Release height (m) and Initial Vertical Dimesion (m)
- Volume sources: Modify the Release height (m), Initial Lateral Dimension (m), and Initial Vertical Dimension (m)

Cut, copy, or paste operations can be achieved through the use of the Edit menu options.



Point							Temperature	Exit velocity	
Area							Release Height	Init. Vert. Disp.	
Volume	Year	Month	Day	Hour	Source ID	Emission Rate	Release Height	Init. Lat. Disp.	Init. Vert. Disp.
1	2000	1	1	1	PT_TALL				
2	2000	1	1	1	VOLROOF1				
3	2000	1	1	2	PT_TALL				
4	2000	1	1	2	VOLROOF1				
5	2000	1	1	3	PT_TALL				
6	2000	1	1	3	VOLROOF1				
7	2000	1	1	4	PT_TALL				
8	2000	1	1	4	VOLROOF1				
9	2000	1	1	5	PT_TALL				
10	2000	1	1	5	VOLROOF1				
11	2000	1	1	6	PT_TALL				
12	2000	1	1	6	VOLROOF1				
13	2000	1	1	7	PT_TALL				
14	2000	1	1	7	VOLROOF1				
15	2000	1	1	8	PT_TALL				
16	2000	1	1	8	VOLROOF1				
17	2000	1	1	9	PT_TALL				
18	2000	1	1	9	VOLROOF1				
19	2000	1	1	10	PT_TALL				
20	2000	1	1	10	VOLROOF1				
21	2000	1	1	11	PT_TALL				
22	2000	1	1	11	VOLROOF1				
23	2000	1	1	12	PT_TALL				
24	2000	1	1	12	VOLROOF1				
25	2000	1	1	13	PT_TALL				
26	2000	1	1	13	VOLROOF1				
27	2000	1	1	14	PT_TALL				

After all the necessary data has either been type in or copied and pasted from a spreadsheet, the data file can be saved and closed.

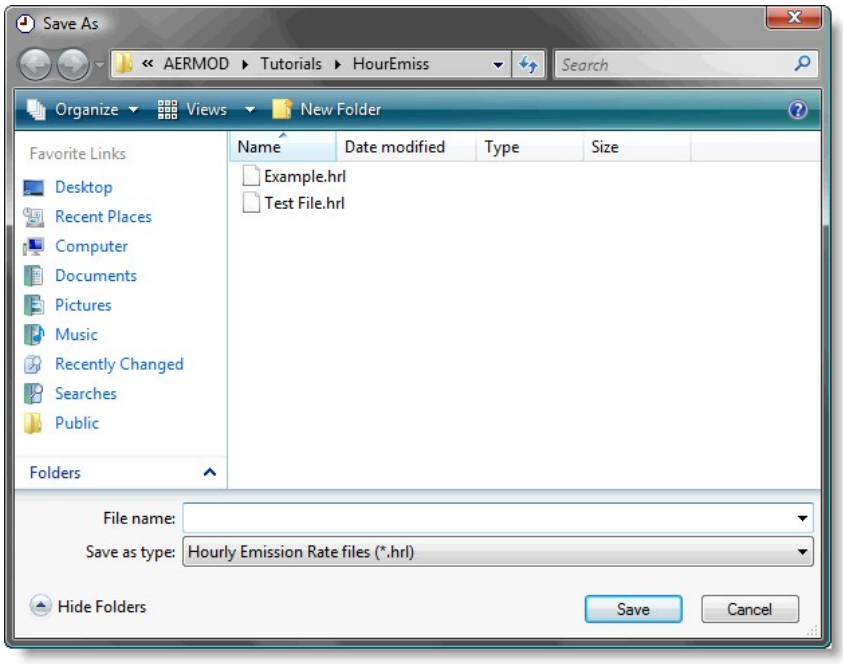
To edit the number of rows or to add a source, there are 4 operations that can be performed from the Edit menu:

1. Append Row (Ctrl-A): this option allows you to add rows at the end of the data table. Each click will append one row to the table.
2. Insert Row (Ctrl-I): this option allows you to insert a row before the selected row in the table.
3. Delete Row (Ctrl-D): this option allows you to delete the selected row in the table. You simply click on the row that you wish to delete, and choose this option
4. Add Source (Ctrl-R): this option allows you to add a new source to the existing hourly emissions data. Choosing this option will create a new Source ID line for every hour in the file.

Saving Hourly Emission Data

After you have created or edited all of the data for your particular project, you are ready to create the properly formatted, hourly emission file. To save the current set of emissions data:

Choose Save or Save As... from the File menu. The Save Hourly Emission File dialog box appears:



Type the file name in the File Name list box and select Save. You then have a file that can be referenced under Input | Source Options | Source Tools in BREEZE AERMOD 6.

Input File Editor

The Input File Editor allows you to open the model input file and edit it as if using a text editor. Caution should be exercised while using this method if the modeler is not familiar with the U.S. EPA keywords and format.

Starting the Input File Editor

From the Tools menu, select the *Input File Editor* menu item. A BREEZE text editor will be displayed that allows you to make additions, deletions, and other modifications to the AERMOD input file.

AERMET Pro

BREEZE AERMET is available in two performance levels:

1. AERMET - installs with BREEZE AERMOD. Requires the merged (.mrg) meteorological data files. This version will create AERMOD model ready meteorological data files once the micrometeorological parameters, albedo, Bowen Ratio, and surface roughness are defined and applied.
2. AERMET Pro - available as an upgrade for those who need to process raw and onsite meteorological data.

NOTE: AERMET Pro is a separate program from BREEZE AERMOD/ISC. To purchase AERMET Pro, please contact us.

What's New in Version 6

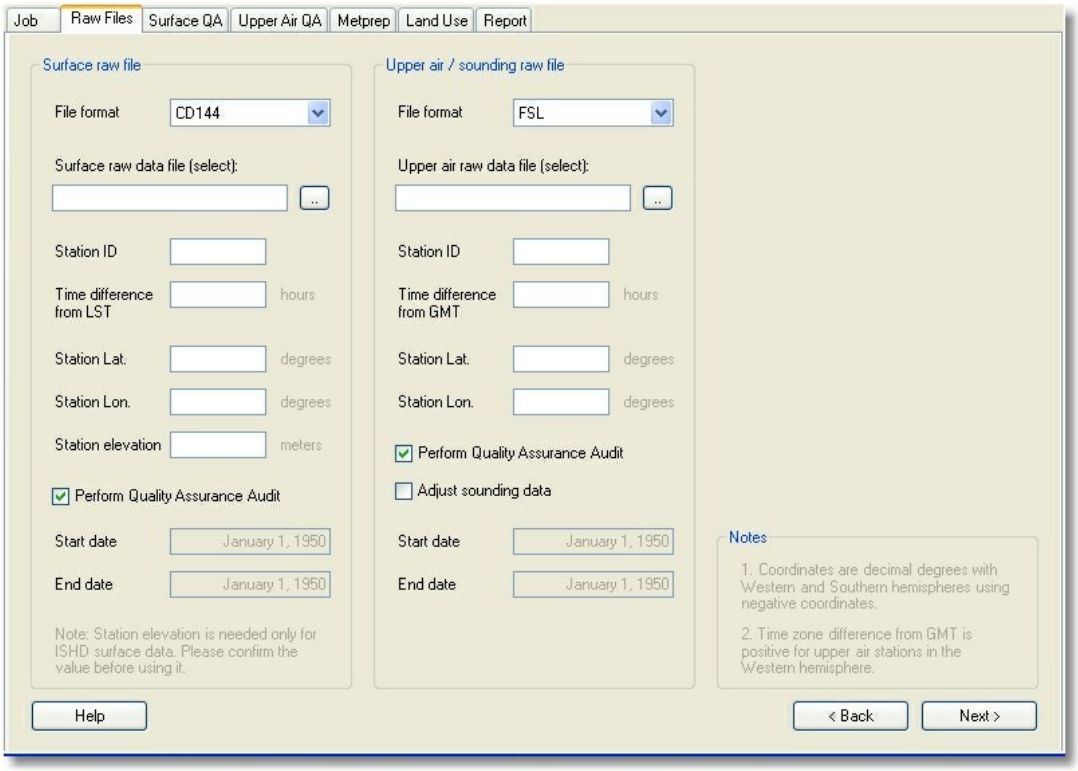
The question "What's new in BREEZE AERMET Version 6" is not so easy to answer. The quickest answer would be "everything" – this is the most radical and major upgrade of the program that we have ever released. Every single function of the program has undergone a complete overhaul and many, many new features have been added. We have listened to the feedback from our users and implemented all the most frequently-requested functions.

However, all these changes don't mean that the program has become unfamiliar – on the contrary. Our top design priority was to maintain the "look and feel" of the program and its highly-intuitive interface so that users upgrading will feel at home immediately.

This section outlines the main new features and improvements introduced in Help & Manual.

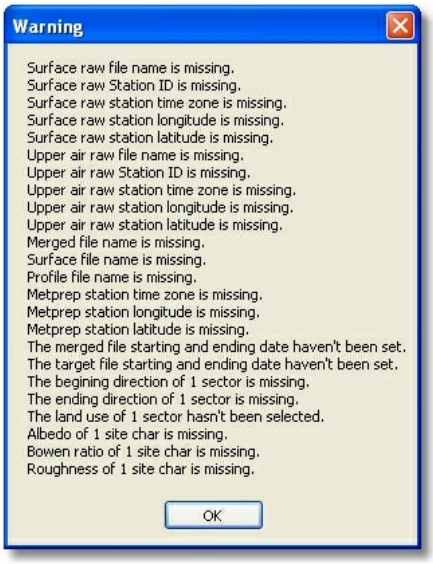
Display Interface

To make the program easier to work in, BREEZE has introduced a new Tabbed Interface that keeps all data display windows open but shows only one at a time. Selecting any of the available views is a easy as clicking on the desired view's tab.



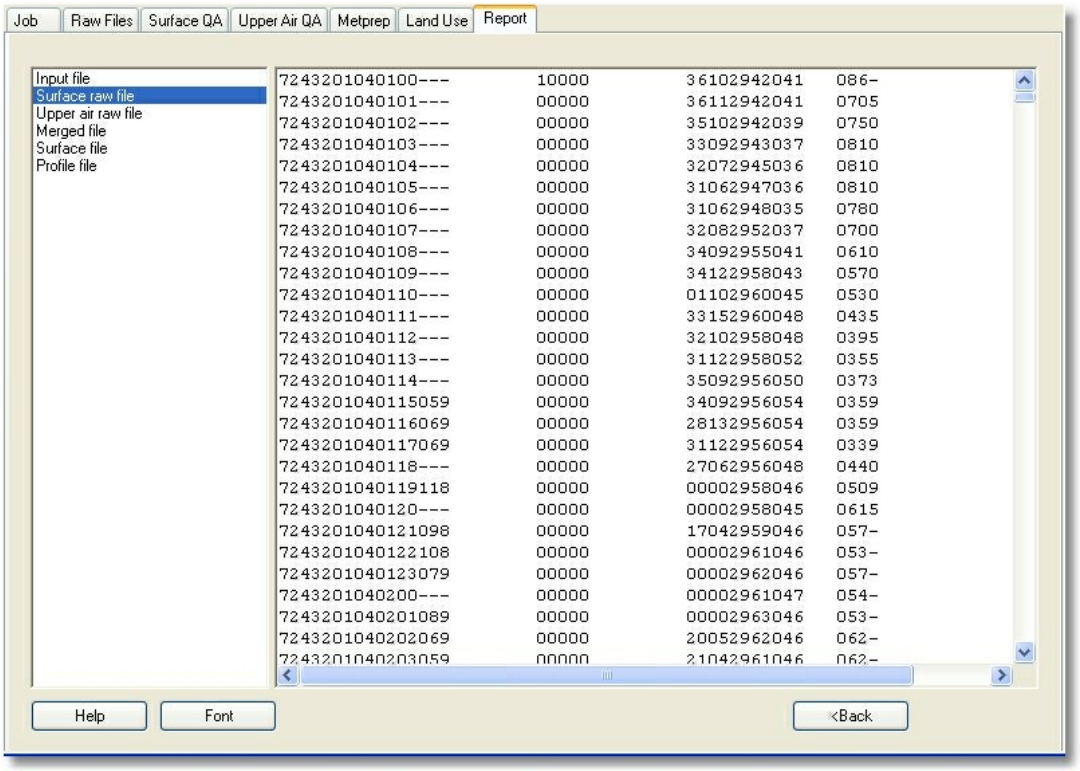
Warnings View

A new feature that has been added that is an enormous help in identifying problematic areas within the processor setup that might prevent it from being run correctly. The new Warning pop-up window details missing and erroneous values that might cause an error when running AERMET.


Warning
Surface raw file name is missing.
Surface raw Station ID is missing.
Surface raw station time zone is missing.
Surface raw station longitude is missing.
Surface raw station latitude is missing.
Upper air raw file name is missing.
Upper air raw Station ID is missing.
Upper air raw station time zone is missing.
Upper air raw station longitude is missing.
Upper air raw station latitude is missing.
Merged file name is missing.
Surface file name is missing.
Profile file name is missing.
Metprep station time zone is missing.
Metprep station longitude is missing.
Metprep station latitude is missing.
The merged file starting and ending date haven't been set.
The target file starting and ending date haven't been set.
The begining direction of 1 sector is missing.
The ending direction of 1 sector is missing.
The land use of 1 sector hasn't been selected.
Albedo of 1 site char is missing.
Bowen ratio of 1 site char is missing.
Roughness of 1 site char is missing.
OK

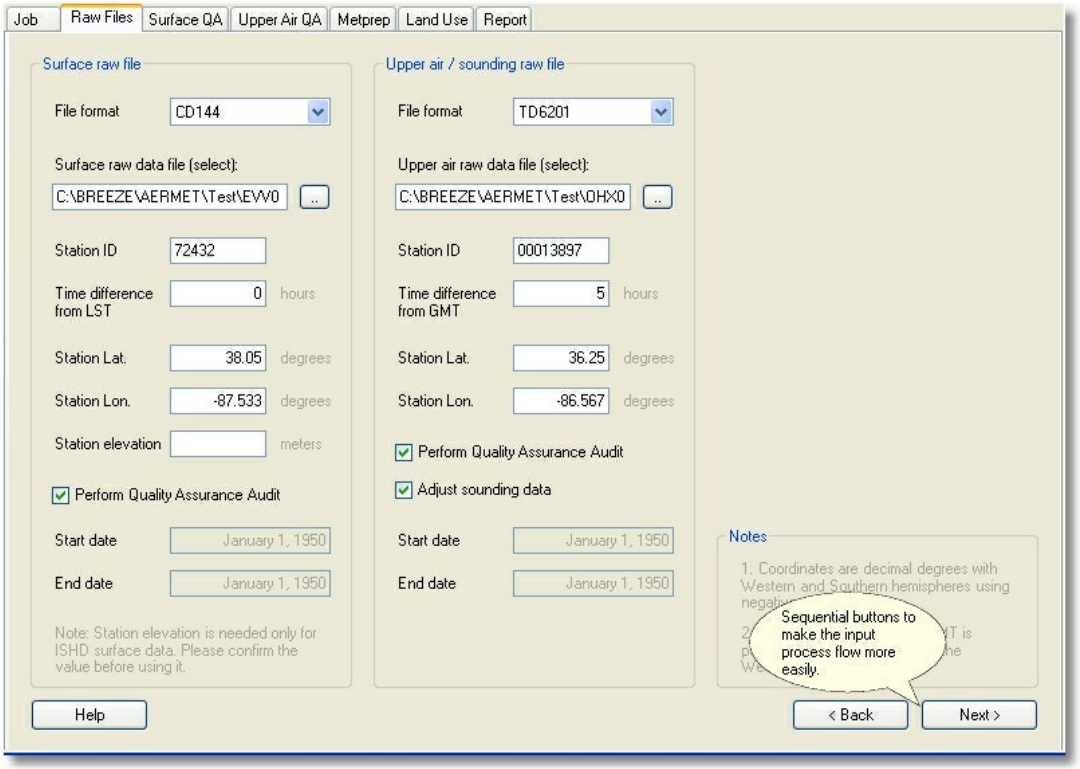
Additonal Reports

The Reports tab now allows the user to visualize not only the input and message files generated by AERMET but the raw meteorological data and warning messages as well.



AERMET Sequential

AERMET 6.0 now allows the user to use "Back" and "Next" buttons to input information more quickly and easily.



About AERMET

BREEZE AERMET is a meteorological preprocessor for use with the AERMOD air dispersion modeling system. It is designed to read, quality assess, and process meteorological data so the data can be read into AERMOD. There are three stages to the BREEZE AERMET preprocessor:

- Stage 1 - Extracts the raw meteorological data, quality assesses it, and calculates mixing height parameters based on surface data.
- Stage 2 - Merges relevant data into a single file for use in Stage 3.
- Stage 3 - Processes the meteorological data for AERMOD using modern turbulence theory.

Because land use parameters can change from place to place and season to season, Stage 3 of BREEZE AERMET is included as an add-in tool in BREEZE AERMOD Analyst. Normally, the meteorological data required by AERMOD can be purchased from Trinity Consultants already processed through Stage 2, so you may never need to run Stages 1 and 2. However, in the event you have a special need to preprocess from the raw data, BREEZE AERMET (including all stages) is available as an upgrade. BREEZE AERMET will allow users to process NWS raw data in the CD144, TD3280, SCRAM, SAMSON, HUSWO, UK-ADMS, and ISHD (TD-3505) formats.

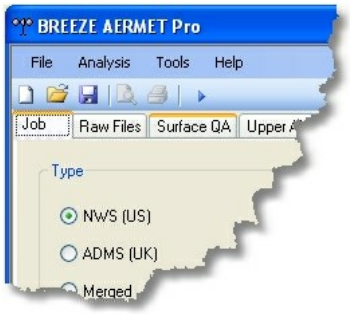
The PBLAER module is included in BREEZE AERMET for computing mixing heights in the absence of appropriate upper air sounding data. This technique is used when upper air sounding data are unavailable or when local times, which correspond to radiosonde ascents (typically 0000 and 1200 GMT), do not occur near sunrise. PBLAER uses a semi-empirical method to estimate the surface similarity parameters of friction velocity, sensible heat flux, temperature scale, and Monin-Obukhov length using routinely collected meteorological variables of cloud cover, ceiling height, wind speed, temperature, and estimates of surface roughness. When ADMS formatted meteorological data is processed in BREEZE AERMET, this technique is employed.

Application Overview

BREEZE has a simple, conventional user interface. The program consists of a main window containing a number of tabs. Across the top of the main window resides a title bar containing the name of the application and the name of the open model scenario file. Below the title bar is the Menus bar and the Toolbar.

When starting AERMET, the Job tab is always displayed first. Depending on which Job Type is selected, different sets of tabs will be made available.

Only one input file can be open at a time. Opening a second input file will simply remove the first input file from memory and replace the contents of the tabs.



Main window title bar, menu bar, and tool bar

File Naming and Extensions

BREEZE AERMET creates a number input and output files for each model scenario. The following is a listing of the default file extensions used for each file.

.ati - (ASCII) AERMET input file. This is the main input file created by AERMET. Prior versions of BREEZE defaulted to a .amt file extension.

.atm - (ASCII) AERMET message output file. This output file displays the messages generated by the AERMET executable during processing. Prior versions of BREEZE defaulted to a .msg file extension.

.atr - (ASCII) AERMET report output file. This output file displays the report detailing the processing completed by the AERMET executable. Prior versions of BREEZE defaulted to a .rpt file extension.

.amt (ASCII) AERMET input file. BREEZE versions prior to Version 6 defaulted to a .amt extension. Version 6 defaults to a .ati extension. The .ati extension helps to better differentiate between the different BREEZE product input files.

.**inp** - (ASCII) AERMET input file. The EPA default file extension.

.mrg - (ASCII) The merged file created by Stage 2 of the AERMET executable. This file combines all of the meteorological data from the raw surface, upper air, and onsite meteorological data files into one file.

.sfc - (ASCII) AERMET surface file. One of the two main output files from Stage 3 of the AERMET executable, this file contains all of the surface-based parameters of the meteorological data to be input into AERMOD.

.pfl - (ASCII) AERMET profile file. The second of the two main output files from Stage 3 of the AERMET executable, this file contains all of the profile-based parameters of the meteorological data to be input into AERMOD.

AERMET Stages

AERMET is made of three stages: raw data extraction and quality assessment, merging data, and creating model input files.

Stage 1

Stage 1 comprises the extraction/retrieval of data and assessment of the quality of the data. Data extraction is generally a one-time activity, while the quality assessment (QA) may be performed several times if the QA identifies problems with the data.

Typically, the NWS upper air and surface data are available from Trinity Consultants or the National Climatic Data Center (NCDC) in a compact format. These formats are designed to minimize the amount of space required to store the data and are not readily interpreted. Therefore, the data that are stored in archive files are first extracted (i.e., retrieved) from the archive file. AERMET can extract data from several standard NCDC formats. Upper air data can be in either the TD-6201 or FSL formats. Hourly surface weather observations can be in the CD-144 format, which is a time-based (i.e., by hour) format, and the TD-3280 format, which is an element-based (i.e., by variable) format for surface data. AERMET also processes the hourly surface data format available from the EPA Office of Air Quality

Planning and Standards (OAQPS) Technology Transfer Network (TTN). This format is a reduced form (fewer variables) of the CD-144.

Thirty years of hourly surface observations for all first order NWS stations in the United States are available from the Solar and Meteorological Surface Observation Network (SAMSON) compact discs. AERMET also processes data in the relatively new ISHD (TD-3505) format. In order to process for use with the deposition or open pit source modules of AERMOD, SAMSON, HUSWO, or ISHD format data must be used.

There is no standard format or content for on-site meteorological data. The data collected on-site most likely will include observations made at one or more levels on an instrumented tower or from remote sensing instrumentation. Additionally, near-surface measurements such as insolation, net radiation, and temperature difference may be included in the database. The non-standardized formats preclude storing these data in a predefined archive format; thus, AERMET does not 'extract' on-site data. However, AERMET is designed to accept a variety of on-site data formats by having the user specify the structure of the data. The data must be in an ASCII file and able to be read with standard Fortran format statements

Quality assessment can be performed on all the data types. The QA process identifies occurrences of missing data, values that are outside a range of values, and inconsistencies between selected variables within an observation period. Default values are defined for the upper and lower bounds and for missing values. The values can be modified through an input file created by the user that controls preprocessor actions. Some variables are checked by default and the user can specify additional variables to be checked.

If AERMET detects anomalous data, a message is written to a file informing the user of the violation. At present there are no provisions for AERMET to automatically replace missing data or correct "suspect" values. The user should review the QA messages and determine if the value(s) require modification or if they are acceptable.

Stage 2

This stage of the processing combines the files from Stage 1 into a single ASCII file. This file is organized so that each block of data contains all of the observations for a 24-hour period. This period begins with hour 1, representing the period from 0001 local standard time (LST) to 0100 LST, and ends with hour 24, representing 2301 LST to 2400 LST. If any input data to this stage of processing are physically missing for the hour (e.g., down-time for instrument maintenance), the meteorological variables for that hour are represented by the appropriate missing value indicators.

Stage 3

The final stage of processing reads the merged file and, in conjunction with site-specific parameters that characterize the underlying surface, produces two input files for AERMOD. The first file contains boundary layer scaling parameters (such as surface friction velocity, mixing height, and Monin-Obukhov length) and reference-height winds and temperature. The second file contains one or more levels (a profile) of winds, temperature and the standard deviation of the fluctuating components of the wind. Generally, this latter file contains the data from an on-site measurement program. In the absence of such data, a single level using NWS hourly surface observations may be used for the profile.

The User Interface

The various window displays of previous versions of BREEZE AERMET have been replaced with a brand-new tabbed interface designed to make entering information quicker and easier than ever before.

Menus and Toolbars

The menu bar accesses all the functions that BREEZE AERMET uses to display and process data. Selecting a menu item will either toggle a property On/Off, execute a function, or open a dialog box.

Frequently used menu items can also be executed using BREEZE AERMET's Toolbar and hot keys. The following sections provide brief descriptions of all the items contained in BREEZE AERMET's menus. References are provided to corresponding toolbar buttons, hot keys, and dialog boxes.

Note 1: Each display window has it's own set of menus. The menu bar for each display window will only be displayed when the respective display windows is selected (active).

Note 2: Only menu items and dialogs that really need explaining are documented in this manual. For example, we assume that the standard File Open dialog is familiar and self explanatory.

List of Menus

Menu	Description
File	Open and save data files. Print contents of Reports tab.
Analysis	Functions to run or verify the AERMET Fortran executables.
Tools	Shows a list of available tools in AERMET.
Help	Accesses the BREEZE help files as well as the BREEZE web site. This menu also provides information about the software, including the version number.

File

The File menu contains the basic options for opening and saving data files. In addition, the File menu contains options for printing the contents of the selected (i.e. active) display window. Most of the options have corresponding Toolbar buttons and keyboard shortcuts assigned to them.

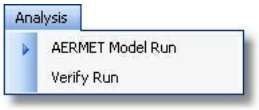
File Menu Toolbar

Toolbar Button	Item	Description
	New...	Closes a model scenario that is open and clears all display views. If changes have been made to an open model scenario, the user will be asked if the file should be saved.
	Open...	Opens the Open File dialog box
	Save...	Opens the Save dialog box if working on a new project or saves data to the currently opened project

	Save As...	Opens the Save dialog box
	Page Setup...	Opens the Page Setup dialog box when the Report tab is open
	Print...	Opens the Print dialog box when the Report tab is open
	Print Preview...	Opens the Print Preview dialog box when the Report tab is open
	Previous Files List	Displays a list of previously opened model scenarios
	Exit	Exits AERMOD/ISC.

Analysis

The Analysis menu provides options to run the Fortran executables of AERMOD and BPIP.



Toolbar Button	Item	Description
	AERMET Model Run	Closes a model scenario that is open and clears all display views. If changes have been made to an open model scenario, the user will be asked if the file should be saved.
	Verify Run	Opens the Open File dialog box

Tools

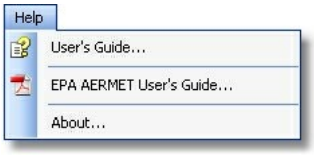
The Tools Menu contains options for plotting, extracting, merging, exporting, and importing data. Each of these options invokes a corresponding dialog box.

Toolbar Button	Item	Description
	MetView	Closes a model scenario that is open and clears all display views. If changes have been made to an open model scenario, the user will be asked if the file should be saved.

Help

The Help menu provides access to this user guide, which can also be accessed at any time by selecting the Help | User's Guide menu item. In addition, this menu also contains a number of links to specific important information and how-to topics in the help and some useful links to the BREEZE Software Web site. You can check whether you are using the latest version of BREEZE AERMET.

The US EPA documentation is also available as Adobe .pdf files. Each can be opened and printed as necessary.



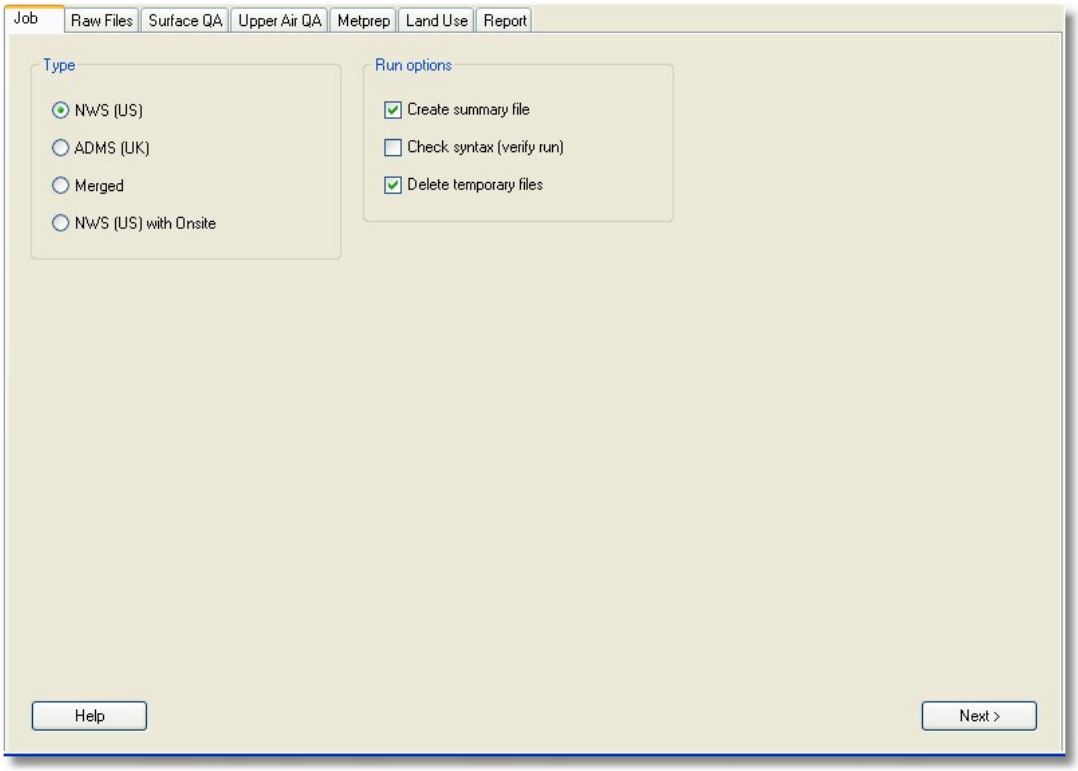
Toolbar Button	Item	Description
	User's Guide	Opens the contents section of this user guide.
	EPA AERMET User's Guide	Opens the U.S. EPA's AERMET User's Guide. Adobe Acrobat Reader is required.
	About	Displays the version number and other information about this program.

Tabbed Interface

One of the biggest changes to BREEZE AERMET Version 6 is replacing the old window display with a new, easy-to-read tabbed interface. The tabs allow the user to easily access of the data that has been input into the product as well as avoids confusion by eliminating unnecessary tabs based on the Job Type selected by the user. Select a tab below to learn more about it.

Job Type

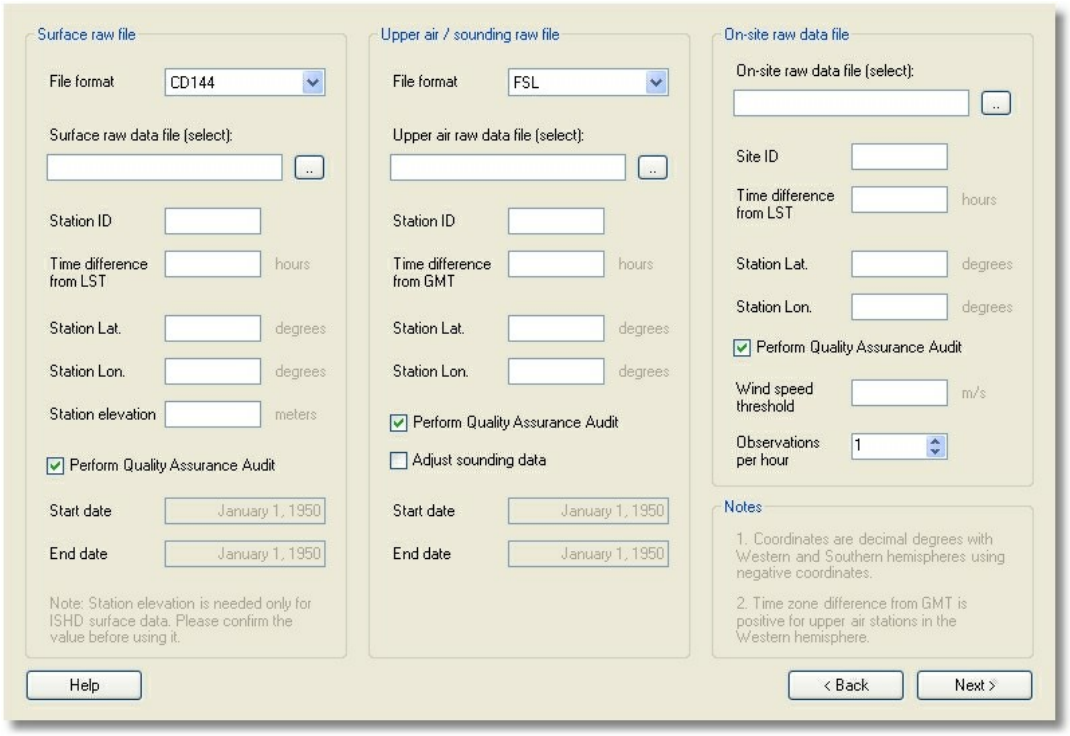
The Job tab is the default tab to which BREEZE AERMET opens. It allows the user to select the Job Type as well as choose Run Options.



Job Menu with Default Selections

Raw Files

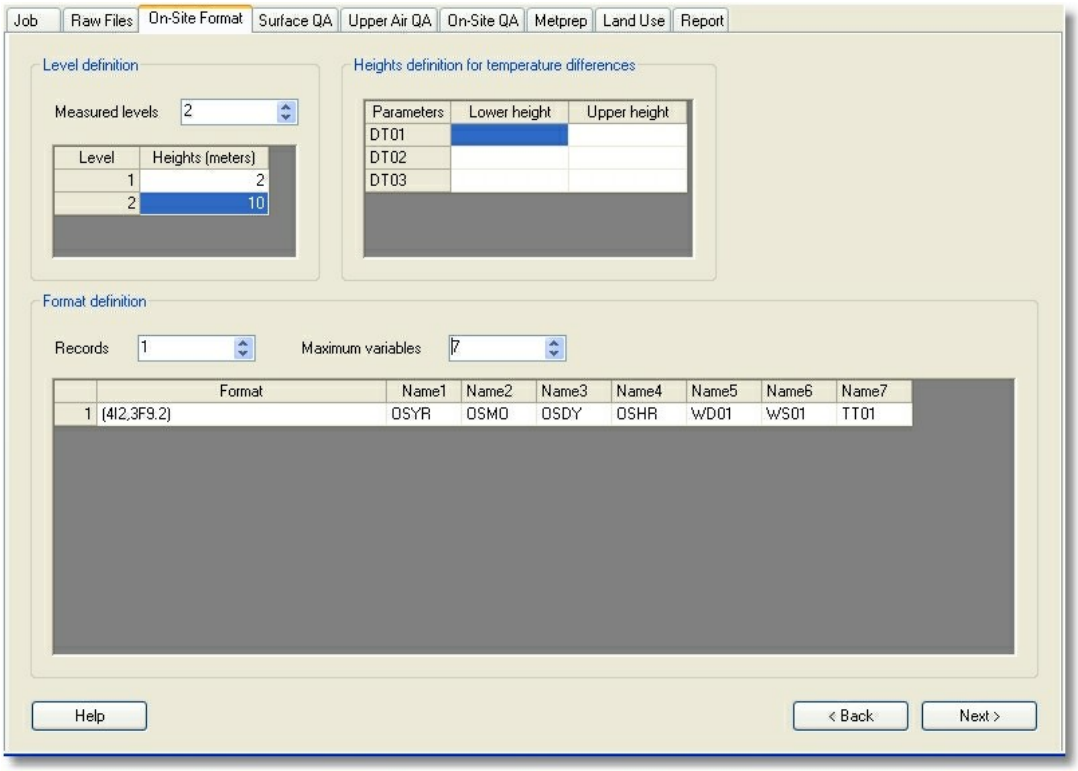
The Raw Files tab is where the user goes to choose the raw files from which they want to collect their raw meteorological data. This tab contains information for all of the raw files that will go into the AERMET project (i.e. surface, upper air, and onsite) making it easier for the user to input the information in one place instead of in several windows.



Raw Files Tab Display for the "NWS (US) with Onsite" Job Type

Onsite Format

The Onsite Format tab is where the user specifies the format that their raw onsite data comes in. The program allows for up to twenty different measured levels, three height definitions for temperature differences, and numerous meteorological variables.



Example of the Onsite Format Tab Display

Surface QA

By selecting the "Perform Quality Assurance Audit" under the Surface raw file heading in the Raw Files tab, AERMET will use the options specified in the Surface QA form to check that the raw data values meet the criteria set by the user. The default Surface QA tab will check station pressure, total or opaque sky cover, dry bulb temperature, wind direction, and wind speed. By selecting the Audit checkbox in each row, the user can choose up to 22 parameters for AERMET to check.

The quality assurance audit is an optional process, but it is recommended to help the user identify possible errors in the data. AERMET will check that the data values are not outside a range of 'acceptable' values as well as keep track of the number of missing values. The user can specify unique ranges and change the missing indicator for each of the 22 parameters but utilizing the Range and NoMis check boxes of each parameter.

The quality assurance audit will only make the user aware of data that might be missing or outside the specified range. The user will have to review the QA summary information and, using sound meteorological principles and any regulatory guidance, either replace the value in question or leave it alone.

Quality assessment

Name	Description	Units	Audit	Range	NoMis	Lower bound	Type	Upper bound	Missing indicator
PRCP	Precipitation amount	millimeters * 1000	☐	☐	☐	0	<=	25400	-9
SLVP	Sea level pressure	millibars *10	☐	☐	☐	9000	<	10999	99999
PRES	Station pressure	millibars *10	☑	☐	☐	9000	<	10999	99999
CLHT	Ceiling height	kilometers *10	☐	☐	☐	0	<=	300	999
TSKC	Total//opaque sky cover	tenths//tenths	☑	☐	☐	0	<=	1010	9999
ALC1	Sky cond//height-level 1	code//hundredths ft	☐	☐	☐	0	<=	300	09999
ALC2	Sky cond//height-level 2	code//hundredths ft	☐	☐	☐	0	<=	300	09999
ALC3	Sky cond//height-level 3	code//hundredths ft	☐	☐	☐	0	<=	300	09999
ALC4	Sky cond//height-level 4	code//hundredths ft	☐	☐	☐	0	<=	850	09999
ALC5	Sky cond//height-level 5	code//hundredths ft	☐	☐	☐	0	<=	850	09999
ALC6	Sky cond//height-level 6	code//hundredths ft	☐	☐	☐	0	<=	850	09999
PWVC	Present weather (vicinity)		☐	☐	☐	9292	<=	98300	9999
PWTH	Present weather		☐	☐	☐	9292	<=	98300	9999
ASKY	ASOS Sky condition	tenths	☐	☐	☐	0	<=	10	99
ACHT	ASOS Ceiling	kilometers*10	☐	☐	☐	0	<=	888	999
HZVS	Horizontal visibility	kilometers *10	☐	☐	☐	0	<=	1640	99999
TMPD	Dry bulb temperature	°C *10	☑	☐	☐	-300	<	350	999
TMPW	Wet bulb temperature	°C *10	☐	☐	☐	-650	<	350	999
DPTP	Dew-point temperature	°C *10	☐	☐	☐	-650	<	350	999
RHUM	Relative humidity	whole percent	☐	☐	☐	0	<=	100	999
WDIR	Wind direction	tens of degrees	☑	☐	☐	0	<=	36	99
WSPD	Wind speed	meters/second *10	☑	☐	☐	0	<=	500	-9999

Default Surface QA Display

Upper Air QA

Similar to the Surface QA tab, the Upper Air QA tab is where the user can set various ranges and options on parameters for AERMET to check. Unlike the Surface QA tab, none of the parameters are automatically audited by AERMET. Because the number of levels in a sounding and the heights at which the data are recorded vary from sounding to sounding, AERMET performs Upper Air audits by dividing the atmosphere into 10 regions: surface, every 500 meters up to 4,000 meters, and everything above 4,000 meters.

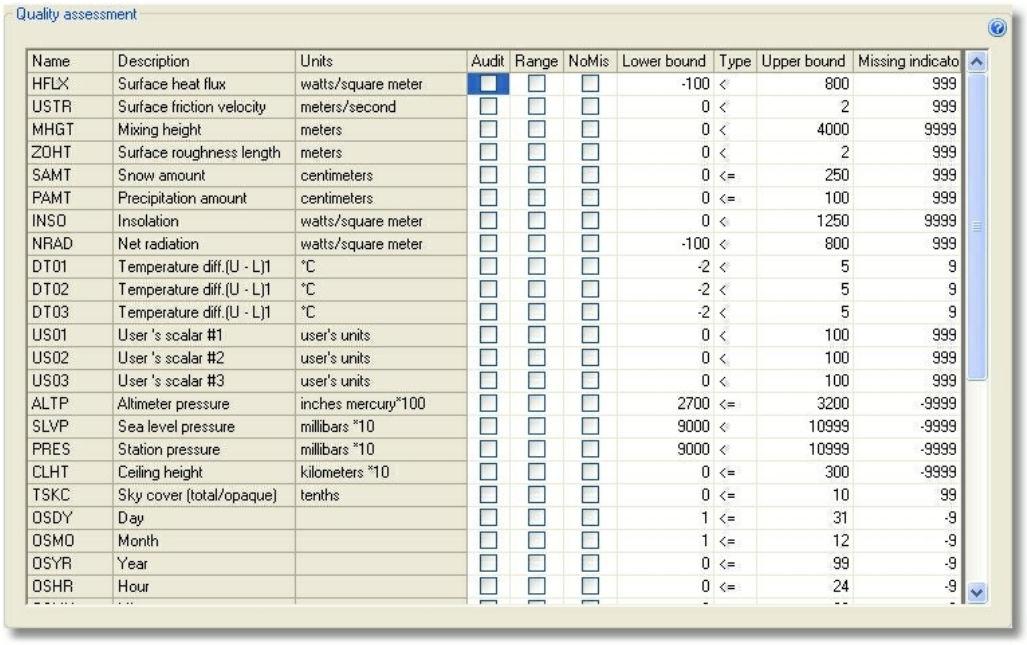
Quality assessment

Name	Description	Units	Audit	Range	NoMis	Lower bound	Type	Upper bound	Missing indicator
UAPR	Atmospheric pressure	millibars *10	☐	☐	☐	5000	<	10999	99999
UAHT	Height above ground	meters	☐	☐	☐	0	<=	5000	-99999
UATT	Dry bulb temperature	°C *10	☐	☐	☐	-350	<	350	-9990
UATD	Dew-point temperature	°C *10	☐	☐	☐	-350	<	350	-9990
UAWD	Wind direction	degrees from north	☐	☐	☐	0	<=	360	999
UAWS	Wind speed	meters/second *10	☐	☐	☐	0	<	500	9990
UASS	Wind speed shear	(m/s)/(100 meters)	☐	☐	☐	0	<=	5	-9999
UADS	Wind direction shear	degrees/(100 meters)	☐	☐	☐	0	<=	90	-9999
UALR	Temperature lapse rate	°C/(100 meters)	☐	☐	☐	-2	<=	5	-9999
UADD	Dew point deviation	°C/(100 meters)	☐	☐	☐	0	<=	2	-9999

Default Upper Air QA Display

Onsite QA

The Onsite QA tab requires even further user interaction if a quality assurance audit is desired. The user must verify that the onsite data they put into AERMET matches the specified units from the QA tab. The default parameters that AERMET will check are dry bulb temperature, wind direction, and wind speed. There are up to 40 different parameters that can be input into AERMET and audited.


Quality assessment

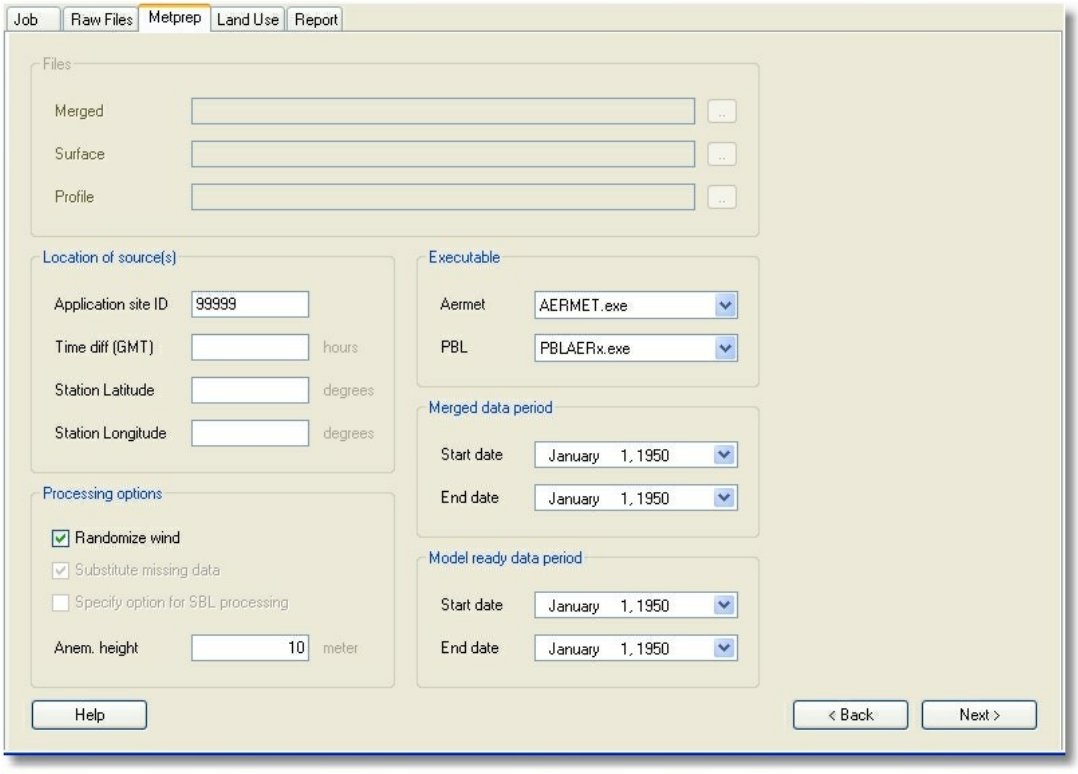
Name	Description	Units	Audit	Range	NoMis	Lower bound	Type	Upper bound	Missing indicato
HFLX	Surface heat flux	watts/square meter	☐	☐	☐	-100	<	800	999
USTR	Surface friction velocity	meters/second	☐	☐	☐	0	<	2	999
MHGT	Mixing height	meters	☐	☐	☐	0	<	4000	9999
ZOHT	Surface roughness length	meters	☐	☐	☐	0	<	2	999
SAMT	Snow amount	centimeters	☐	☐	☐	0	<=	250	999
PAMT	Precipitation amount	centimeters	☐	☐	☐	0	<=	100	999
INSO	Insolation	watts/square meter	☐	☐	☐	0	<	1250	9999
NRAD	Net radiation	watts/square meter	☐	☐	☐	-100	<	800	999
DT01	Temperature diff.(U - L)1	°C	☐	☐	☐	-2	<	5	9
DT02	Temperature diff.(U - L)1	°C	☐	☐	☐	-2	<	5	9
DT03	Temperature diff.(U - L)1	°C	☐	☐	☐	-2	<	5	9
US01	User 's scalar #1	user's units	☐	☐	☐	0	<	100	999
US02	User 's scalar #2	user's units	☐	☐	☐	0	<	100	999
US03	User 's scalar #3	user's units	☐	☐	☐	0	<	100	999
ALTP	Altimeter pressure	inches mercury*100	☐	☐	☐	2700	<=	3200	-9999
SLVP	Sea level pressure	millibars *10	☐	☐	☐	9000	<	10999	-9999
PRES	Station pressure	millibars *10	☐	☐	☐	9000	<	10999	-9999
CLHT	Ceiling height	kilometers *10	☐	☐	☐	0	<=	300	-9999
TSKC	Sky cover (total/opaque)	tenths	☐	☐	☐	0	<=	10	99
OSDY	Day		☐	☐	☐	1	<=	31	-9
OSMO	Month		☐	☐	☐	1	<=	12	-9
OSYR	Year		☐	☐	☐	0	<=	99	-9
OSHR	Hour		☐	☐	☐	0	<=	24	-9

Onsite QA Tab Display

Metprep

By combining all of the Metprep options that were in different tabs in the previous versions of BREEZE AERMET into a single tab, entering in options for AERMET to process is now easier than ever before. Here, the user can specify the location of the source to be modeled, select the processing options for AERMET to use, and choose the executable they wish to use.

Another major change is the selection of the data period. Instead of having to enter in a data period for every type of file (e.g. surface, upper air, onsite), the user can now set one period for the raw data (the "Model ready data period" selection area) and one period for the merged data file. The data period ranges are also easier to understand.



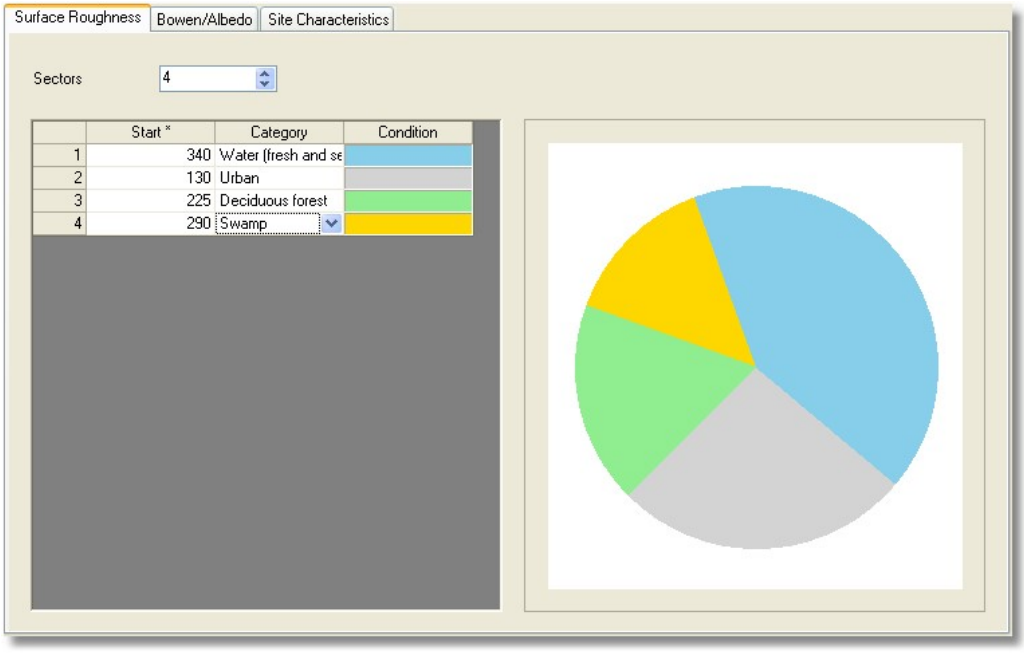
Metprep Display for "NWS (US) with Onsite" job type.

Land Use

The Land Use tab now provides the user with more ways to easily enter in the three required surface parameters of surface roughness, albedo, and Bowen ratio. The Land Use tab consists of three sections:

Surface Roughness

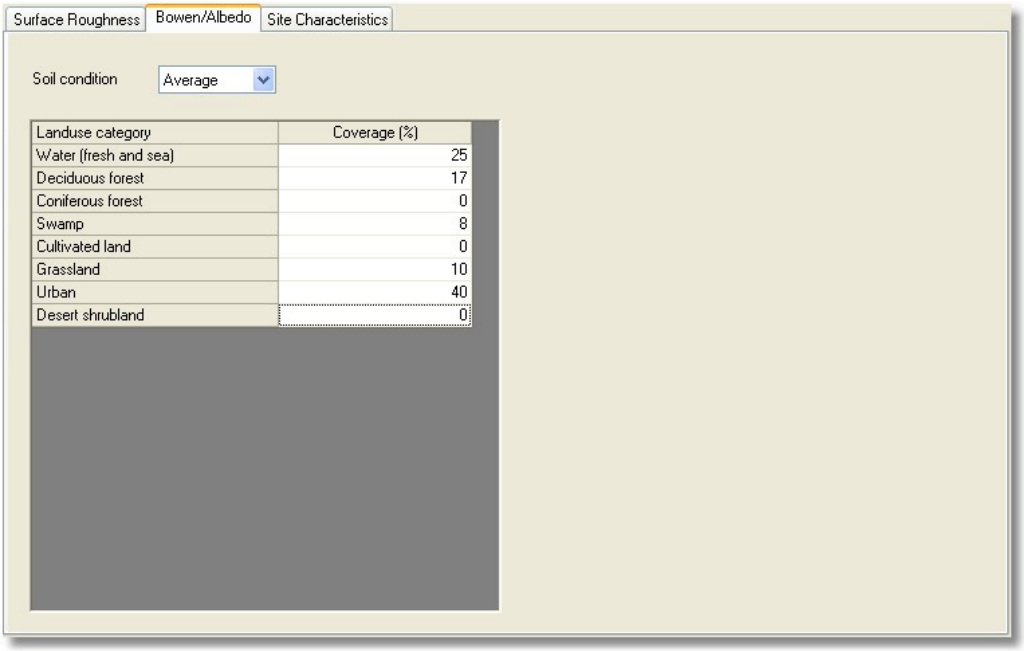
Here the user can define land use categories for different sectors surrounding their project site for the purpose of defining surface roughness.



Land Use Surface Roughness Display

Bowen/Albedo

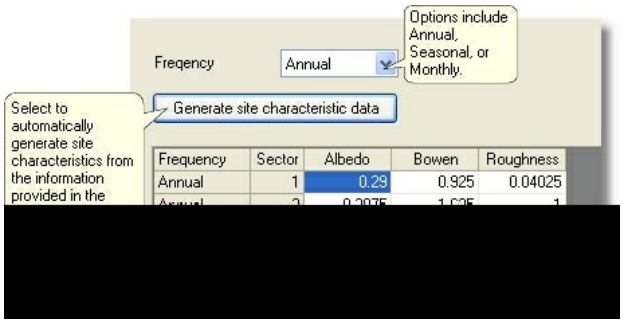
Here the user can define the percentages of land use categories for a 10km x 10km area surrounding their project site for the purpose of defining Bowen ratio and albedo.



Land Use Bowen/Albedo Display

Site Characteristics

The user can generate the surface parameters through several methods: automatic generation based on the sectors defined by the user, manual input in the available boxes, or point-and-click as in previous versions of BREEZE AERMET.



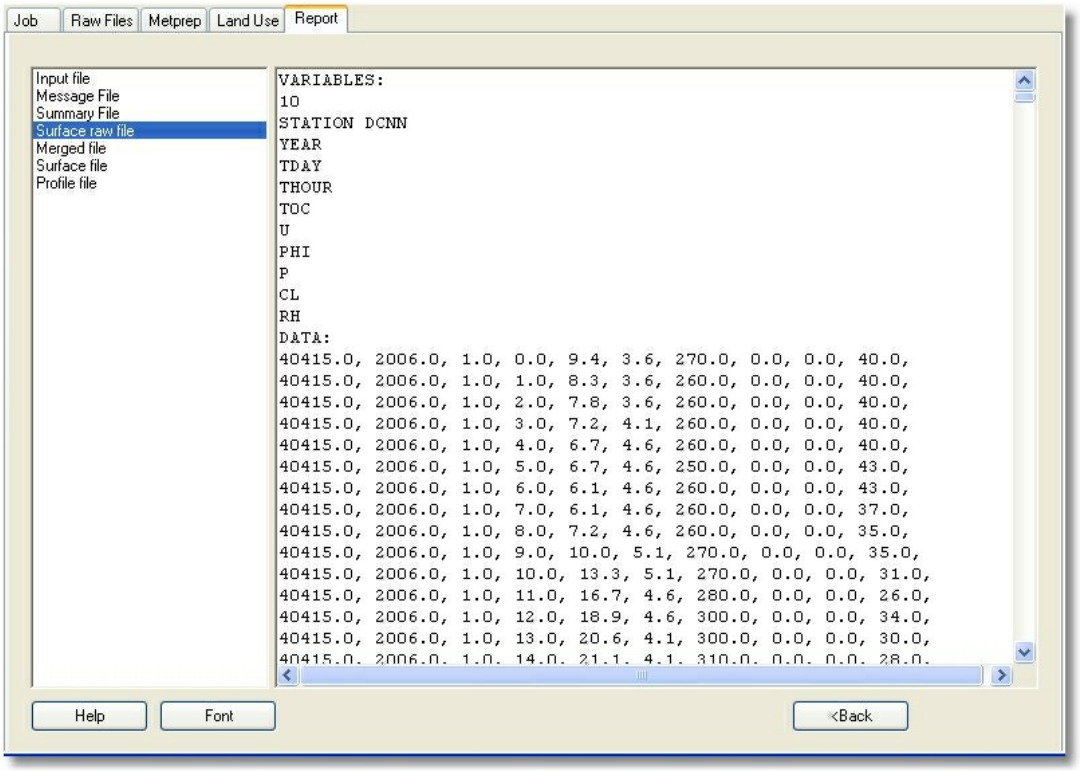
Automatic Generation of Site Characteristics.

Point-and-Click to Generate Site Characteristics like in Previous Versions of BREEZE AERMET.

Point-and-Click to Generate Site Characteristics like in Previous Versions of BREEZE AERMET.

Report

The Report tab replaces the Reports window from previous versions of BREEZE AERMET. Version 6 still displays the input and output files as before, but now it allows you to view raw meteorological files as well.



Basic Working Procedures

This section describes the most common basic tasks you will use when working with BREEZE AERMET. It is designed as a "How-To" guide. You can use the table of contents as an index. Although it is organized roughly in the order that you would perform the tasks you don't need to begin at the beginning and work your way through. Every topic contains comprehensive links to background information and other relevant subjects so you can just pick out the task you need to perform and begin.

The topics in this section are intentionally kept as brief as possible. The focus is on how to do what you need to do. More detailed background information on many subjects is provided in other areas.

Opening a Data File

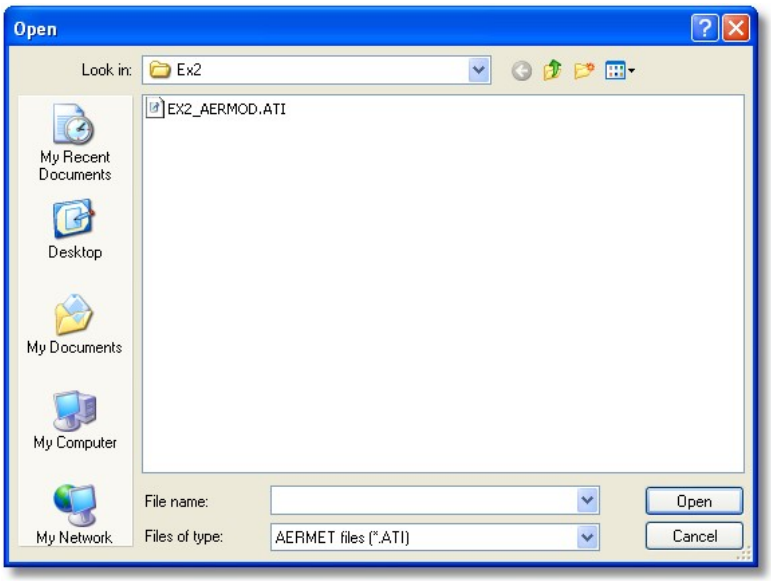
BREEZE AERMET can open, display, and process a single model scenario at a time.

To invoke the Open File dialog using one of three methods:

1. Select Open in the File Menu

2. Click the File button on the Toolbar

In the Open File dialog select a file type, navigate to your data folder, select the file name, and press the Open button (or just double click the file name).



Entering Data

By using the new Tabbed Interface and Sequential tool, entering information into AERMET is easier than ever before.

Running The Model

After the necessary information has been entered, the model can be run. This is accomplished by selecting the Analysis | Run menu item. Whenever the project is saved, the Warnings Window will pop up if necessary.

Reviewing Results

After a model run finishes, all the input and output files from the project will be printed in the Reports Tab.

Model Options

This section details how to enter and edit project information for each of the various job types in AERMET.

Job: Displays the Job Type and Run Options. See "Job" for more information.

Raw Files: Displays the forms for entering in the raw meteorological data and its subsequent location information into AERMET. See "Raw Files" for more information.

QA Files: Displays the Quality Assessment forms where the user can select the unique parameters and ranges they want the model to check. See "QA Files" for more information.

Metprep: Displays the forms for output file name identification, specifying source location, identifying processing options, verifying the data period, and selecting the executable to run. See "Metprep Options" for more information.

Land Use: Displays the forms for determining land use sectors, entering in the site-specific micrometeorological parameters (albedo, Bowen ratio, and surface roughness), and identifying other site-specific information. See "Land Use" for more information.

Report: Displays the input and output files for the user to view. See "Reports" for more information.

Job

The Job tab is the first tab that the user encounters when opening BREEZE AERMOD/ISC. There are two main sections to the Job tab - "Job Type" and "Run Options"

Job Type

In the full version of AERMOD/ISC, there are four job types that can be selected - NWS (US), ADMS (UK), Merged, and NWS (US) with Onsite. In BREEZE AERMOD/ISC Lite (which comes with the BREEZE AERMOD product), Stage 3 is the only part of the AERMET executable available so the Job Type will be limited to Merged.

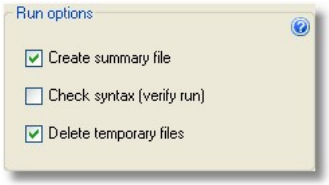
Job Type options for AERMET Pro.

Job Type options for AERMET Lite.

The job type is primarily dependant upon the types of raw meteorological data that will be input into the model.

- **NWS (US) -** Uses both raw surface and raw upper air met. data. The available raw surface formats are CD-144, SCRAM, SAMSON (Solar And Meteorological Surface Observation Network), TD-3280, ISHD (Integrated Hourly Surface Data, TD-3505), or HUSWO (Hourly Surface Weather Observations). Raw upper air formats are TD-6201 or FSL. This option is used primarily for stations located in the United States as well as some stations in other parts of North America.
- **ADMS (UK) -** Uses raw surface met data in the United Kingdom ADMS format. This job type is used for jobs located in countries outside of the United States because of time zone-dependent calculations performed on raw upper air data by the model.
- **Merged -** Uses .MRG output data from Stage 2 of AERMET to perform the planetary boundary layer calculations on the site being modeled and generate model-ready meteorological data files for use in AERMOD. This is the only option available to users of AERMET Lite.
- **NWS (US) with Onsite -** Uses the same input data as the "NWS (US)" job type, but also allows for the inclusion of onsite meteorological data which is formatted by the user.

Run Options



Run Options with default selections

The Run Options selections assist the user in verifying that AERMET processed the data without any errors or warnings that might cause difficulties in the processing.

- **Create summary file -** Selecting this option will generate a file which interrogates the file of messages, tabulates the different types of messages (errors, warnings, etc.), and summarizes all the actions for that particular run in a single file. This file has a .RPT extension, and it is automatically given the name that the project is saved with.
- **Check syntax (verify run) -** This option will process all of the statements in a runstream file prior to processing any data. Incomplete information on a keyword or the omission of a keyword will cause AERMET to terminate the run. If this option is selected, AERMET will process the runstream file and report any problems without performing any data processing. The user can review the summary and message files and correct any errors or make any changes to the runstream file prior to actually processing data.

NOTE: SELECTING THE "CHECK SYNTAX (VERIFY RUN)" OPTION WILL ONLY CHECK FOR WARNINGS AND ERRORS. THE AERMET EXECUTABLE WILL NOT BE RUN, AND THE SURFACE AND PROFILE FILES WILL NOT BE GENERATED.

- **Delete temporary files** - Select this option if you would like to delete the temporary files that are generated by AERMET after the model run has completed. This will eliminate the "working" files used by AERMET when they are no longer needed (e.g. .EX1, .EX2, .tmp files).

Raw Files

The Raw Files tab is where the location of the raw meteorological data is input into AERMET along with information about the location at which the data was collected. There are two important notes noted on this tab:

1. Coordinates that are entered by the user should be in decimal degrees, and **negative** coordinates are used in the **Western & Southern** hemispheres.

2. Time zone differences from Greenwich Mean Time (GMT) are positive for upper air stations in the **Western** hemisphere.

Depending on the job type, there are four different types of raw files that can be input into AERMET. Some of the data to be entered looks the same in each area, but there are unique options to each job type. Select from the list below to learn more.

Surface

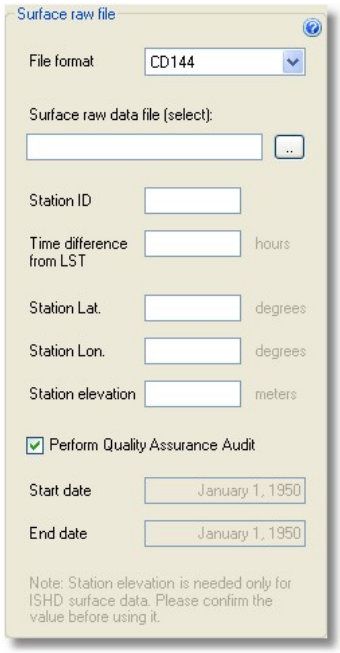
Upper Air

Onsite

ADMS Surface

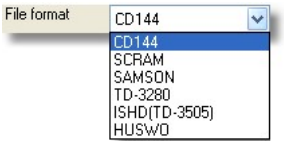
Surface Raw File

The Surface Raw File options combine all of the tabs from the Surface Options window in previous versions of BREEZE AERMET to make input easy. In this section, all the necessary information for processing the hourly surface weather observations or surrogate data that complies with an established format are defined. These data provide information on temperature, winds, and cloud cover (particularly important) that can be used in estimating dispersion parameters. The data generally come from observation stations (with observations taken 24 hours per day) located at or near airports.



File Format

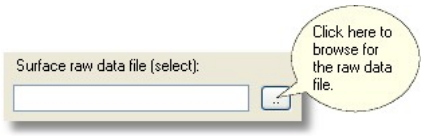
AERMET can read and process surface data from a variety of formats.



Drop-down list of available raw surface formats

- **CD-144 -** The Card Deck 144 (CD-144) format is an older standard format used by the National Climatic Data Center for archiving surface observations. Alphanumeric characters are used to represent various weather elements.
- **SCRAM -** The SCRAM format is a reduced version of the CD144 format. Fewer weather elements are reported. Each logical record includes data for cloud ceiling height, dry bulb temperature, wind speed and direction, and opaque sky cover.
- **SAMSON -** Solar and meteorological data for the first order stations in the United States for the period from 1981-1990 are available on a set of three CD-ROMs collectively referred to as the SAMSON data. AERMET processes the data retrieved from these CD-ROMs.
- **TD-3280 -** Another standard format used by NCDC for archiving surface observations. NCDC halted use of this format in the beginning of 2006, but they still provide TD-9956 converted to 3280 format data.
- **ISHD (TD-3505) -** Integrated Surface Hourly Development format data is the newest NCDC format. It is a combination of the TD-3280 and TD-9956 observational archives and the TD-3240 precipitation archives. The files provided from NCDC then contain surface and precipitation data for nearly 20,000 stations around the world.
- **HUSWO -** Hourly Surface Weather Observations provided by NCDC which consists of DATSAV3, TD-3280, and TD-3240 observational archives for 1995-2003 for 12,000 global stations.

Surface Raw Data File



Using the browse button from the Surface raw data file selection region, the user can select from a number of different file extensions based on the File format chosen. BREEZE AERMET will read the raw file and attempt to automatically generate some of the subsequent file data for you.

Station ID

A five character alphanumeric specifier that identifies the met. station for which data are to be extracted. The Station ID must be specified with leading zeroes to fill the entire field (e.g. 03928 must be entered as 03928). This field will be automatically entered by AERMET if possible.

Time Difference from LST

The Time difference from LST field represents an adjustment factor that is subtracted from the reported hour to convert the time to local standard time. The default value is zero, and most surface data formats processed by AERMET report the time as local standard time.

Station Latitude and Station Longitude

The latitude and longitude forms are automatically entered by AERMET if the Station ID is identified in the master station file. These values are entered as decimal degrees, and they are **negative** for the **Western & Southern** hemispheres.

Station Elevation

This data is only needed if the ISHD file format is selected. The value should be confirmed by the user prior to input.

Quality Assurance Audit

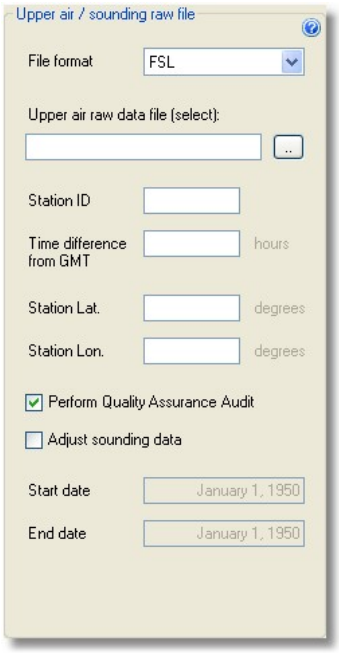
This enables the options in the Surface QA tab for the purposes of verifying that the raw data being input into AERMET is processed correctly. This option is selected by default.

Start Date and End Date

Unlike previous versions of BREEZE AERMET, Version 6 has consolidated the data period selections in the Metprep Options tab. These fields are for visualization purposes only and cannot be modified by the user.

Upper Air Raw File

As with hourly surface observations, data stored in this format is referred to as archived data. AERMET reads and interprets the sounding data and writes it to a separate file for processing.



File Format

There are two formats of raw upper air data that can be read by AERMET:

Drop-down list of upper air formats

- **TD-6201 -** Raw upper air data archived by NCDC.
- **FSL -** Forecast Systems Laboratory series data available from NOAA.

Upper Air Raw Data File

Using the browse button from the upper air raw data file selection region, the user can select from a number of different file extensions based on the File format chosen. BREEZE AERMET will read the raw file and attempt to automatically generate some of the subsequent file data for you.

Station ID

A eight character alphanumeric specifier that identifies the met. station for which data are to be extracted. The Station ID must be specified with leading zeroes to fill the entire field (e.g. 14735 must be entered as 00014735). This field will be automatically entered by AERMET if possible.

Time Difference from GMT

A major difference from the raw surface data entry is, with upper air, the Time difference field is measured from GMT instead of local standard time. This field is **positive** for stations in the Western hemisphere (i.e. 5 for Eastern Standard Time, 6 for Central Standard Time, etc.).

Station Latitude and Station Longitude

The latitude and longitude are automatically entered by AERMET if the Station ID is identified in the master station file. These values are entered as decimal degrees, and they are **negative** for the **Western & Southern** hemispheres.

Quality Assurance Audit

This enables the options in the Upper Air QA tab for the purposes of verifying that the raw data being input into AERMET is processed correctly. This option is selected by default.

Sounding Data Adjustment

AERMET has been designed to check for problems with the upper air data and correct them if this check box is selected. This option directs AERMET to 'turn on' the process and perform some preliminary quality control as the data are extracted. The following actions occur:

1. Some mandatory levels are deleted from the sounding;

2. A nonzero wind direction is set to 0 if the wind speed is 0;
3. Missing ambient and dew point temperatures are replaced by interpolated values;
4. If a mandatory sounding level is within one percent of a significant level (with respect to pressure), then the mandatory level is deleted. This modification is performed to reduce the possibility of reporting large gradients during the quality assessment (if the user opts to QA those gradients). There is little loss of information in the sounding since mandatory levels are derived from significant levels. However, the deletion process takes place after the data are extracted from the archived data and reduces the number of levels extracted.

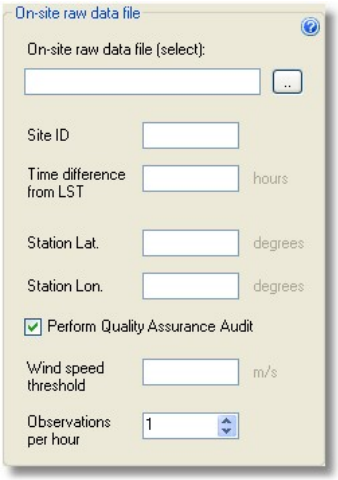
AERMET does not attempt to read more levels after deleting a level. The wind speed and wind direction at each level is checked to ensure that there are no levels with a zero wind speed and a non-zero wind direction. If one is found, the wind direction is set to zero to represent any calm conditions. At present, the winds from the soundings are not used in any boundary layer parameter estimates. If the dry-bulb temperature is missing at some level, then an estimate for the missing temperature is made by linearly interpolating to the level in question. If the data that are required for the interpolation are also missing, then no interpolation is performed.

Start Date and End Date

Unlike previous versions of BREEZE AERMET, Version 6 has consolidated the data period selections in the Metprep Options tab. These fields are for visualization purposes only and cannot be modified by the user.

Onsite Raw File

The Onsite Raw File input options look very similar to the Surface Raw File options at first glance.



When the "NWS (US) with Onsite" job type is selected, the Onsite Format tab is made available. The model will not run without information about the data format.

Onsite Raw Data File

As before, the user can select their raw onsite data by using the browse button to the right of the input field. Unlike the surface and upper air raw data file fields, AERMET cannot automatically read any information from onsite data files because each format is unique.

Site ID

An eight character alphanumeric specifier that identifies the met. station for which data are to be extracted.

Time Difference from LST

Just as in the surface raw data file information, the Time difference from LST field represents an adjustment factor that is subtracted from the reported hour to convert the time to local standard time. The default value is zero, and most surface data formats processed by AERMET report the time as local standard time.

Station Latitude and Station Longitude

The latitude and longitude are entered as decimal degrees, and they are **negative** for the **Western & Southern** hemispheres.

Quality Assurance Audit

This enables the options in the Onsite QA tab for the purposes of verifying that the raw data being input into AERMET is processed correctly. This option is selected by default.

Wind Speed Threshold

This value input by the user defines the lowest allowable wind speed in the onsite data. Any wind speeds that are less than this value are treated as calm.

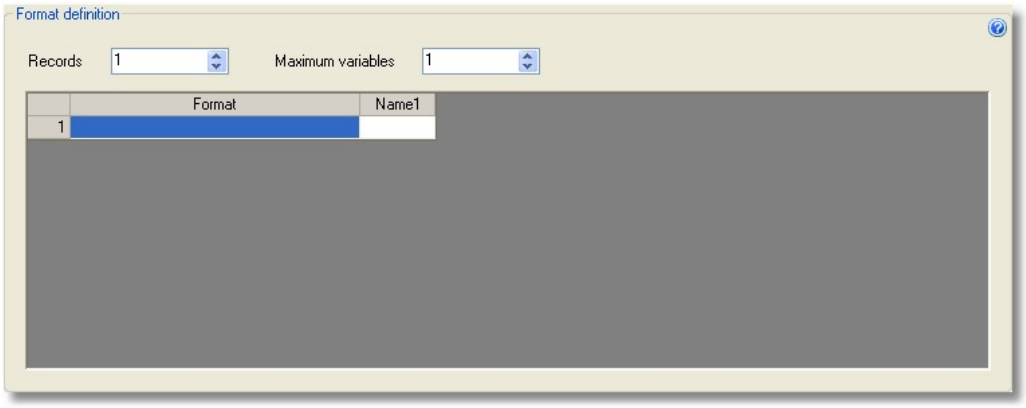
Observations per Hour

Up to 12 observation periods per hour (i.e. every 5 minutes) are allowed by AERMET. For data with more than one observation per hour, the average over all periods within the hour are taken to produce an hourly average for use in calculations. In order for AERMET to computer the average, at least half of the observations for a variable must not be missing. If more than half are missing, the value for the hour is set to missing.

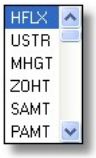
Onsite Format

The Onsite Format tab contains information fields so that the model can identify, check, and process site-specific meteorological data that is input by the user. Much of this type of data can be used in AERMET to provide better estimates of the boundary layer parameters than using NWS data alone.

Format Definition



The Format Definition field is where the exact format of the onsite data being input into AERMET goes. The raw file can have up to 20 records per observation and each record can have up to 40 variables specified. The variables are specified via drop-down lists.



Onsite Parameter List

While the format is reasonably flexible, there are some restrictions that the data are subject to:

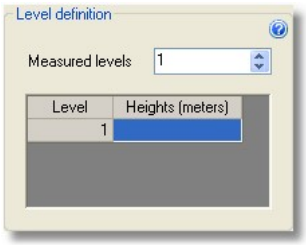
- the records for one period must be contiguous;
- the same variables must appear for all observation periods;
- the date and time information for each observation must be on the first record of the period; these may occur in any order within the first record, and must be in integer format;
- single-level variables must be read before any multi-level (e.g. tower) variables; and
- the file must be ASCII and it must be in a form that can be read using Fortran FORMAT statements.

When specifying the multi-level variables, such as observations from an instrumented tower, the variable name is composed of a two-character prefix that identifies the atmospheric quantity and a two-character suffix that identifies the level. For example, height, temperature and wind speed from the first level would appear as HT01, TT01 and WS01 on the READ keyword, HT02, TT02, WS02 from the second level, and so on. The same variables do not have to appear on each record. For example, winds may appear at three levels but temperature only at two levels.

The *Fortran_format* is a character string that AERMET uses directly in the program. Hence, the string must comply with all the rules of Fortran for creating a format statement. The format must begin with an open parenthesis and end with a closing parenthesis. The list-directed format specifier (an asterisk, *) cannot be used because the parentheses are required and the string "(*)" is not recognized by AERMET and the compilers that created the executable code. Any book on standard Fortran can provide guidance on constructing a format statement.

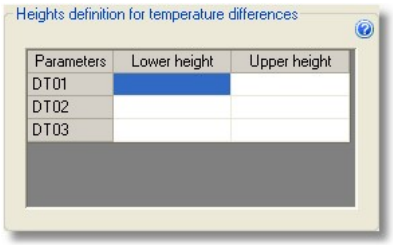
Blanks in the format specification must be avoided because AERMET interprets blanks as field delimiters on the keywords. Blanks in the format specification will cause an error in processing the keyword. Not all of the variables present in the site-specific data file need to be read. Any superfluous data can easily be skipped over using the X, T and / edit descriptors.

Level Definition



Up to 20 measured levels can be accepted from the onsite data, but they must be listed from lowest to highest in meters). The data entered here will override any height information provided in the raw file.

Heights Definition for Temperature Differences



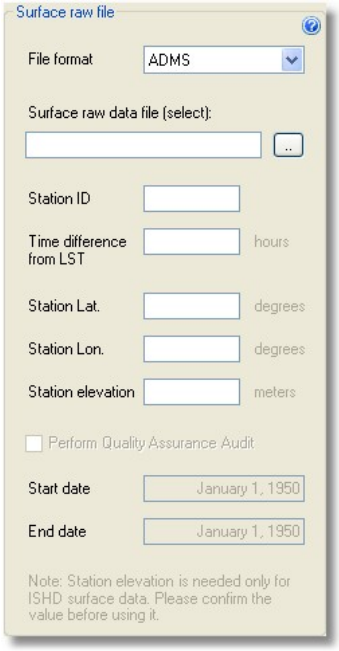
Temperature difference near the surface can be used to infer sensible heat flux which can help in the boundary layer calculations by using known values of sensible heat flux as opposed to calculated values based on less precise calculations.

NOTE: Measured temperature differences are not the same as the ambient temperature difference between two levels.

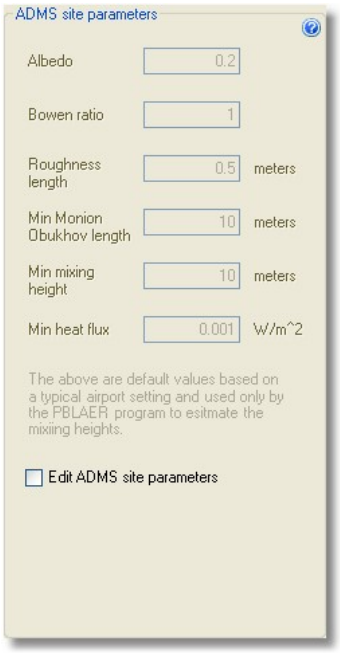
Up to values of delta temp can be processed by AERMET. For each value, the lower and upper height (in meters) must be entered in this form. An error will be generated if heights are defined for the delta temp values, but DT01, DT02, or DT03 are not selected in the Format Definition section.

ADMS Surface Raw File

The options for the ADMS Surface Raw File are the same as the Surface Raw File, except the only file format available is "ADMS".



In the Raw Files tab for the ADMS job type, there is also a list of site parameters.



The forms are filled in by default using values based on a typical airport setting. These parameters are used by the PBLAER program to estimate the mixing heights since raw upper air data is not used for the ADMS job type. These can be edited by selecting the "Edit ADMS site parameters" option at the bottom of the region.

QA Files

One purpose of AERMET is to contribute to the quality assurance process by identifying data that are out of range or suspect such that the user can determine appropriate steps to accept, modify, or reject the data. The quality assessment (QA) is performed by selecting the Perform Quality Assessment Audit check box in each of the raw file forms. When this box is checked, the appropriate tab is displayed.

Quality assessment is an optional process and the user does not have to perform a QA prior to merging the data. However, this step is recommended to identify possible errors in the data that are used to derive the boundary layer parameters.

Presently, AERMET's capabilities in this area are limited to verifying that the values of the weather elements are not outside a range of 'acceptable' values and keeping track of the number of missing values. These checks operate on one observation period at a time, i.e., temporal variations of the data are not checked.

Surface QA

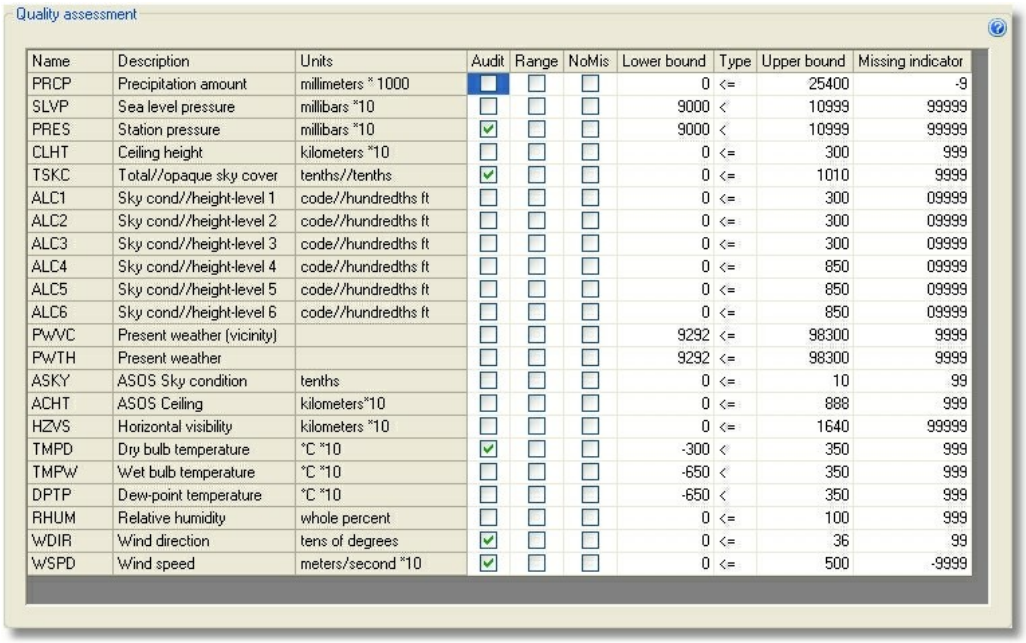
In the Surface Options form, when a quality assessment is performed, several of the weather elements are automatically tracked (audited) and included in a summary of the QA process. These elements are:

- station pressure,
- total and opaque sky cover,
- dry bulb temperature,
- wind speed, and
- wind direction.

The hourly value of each variable is compared to a missing value indicator and if the value is not missing, then the value is compared to an upper and lower bound that define the range of acceptable values. Each time a value is missing or violates one of the bounds, a message is written to the message file. The message includes the value, the violation, and the time of occurrence. The date is reported in the first field in the message. The number of times the weather element is missing, exceeds the upper bound and exceeds the lower bound is tallied and reported in the summary file.

In the current version of AERMET there are no provisions for automatically replacing missing values or adjusting values that are outside the range of acceptable values. It is up to the user to review the QA summary information and, using sound meteorological principles and any regulatory guidance, either replace the value in question or leave it alone.

There are default upper and lower bounds in AERMET, as well as default missing value indicators. The user can change these values by selecting the parameters the user wants to include in the Range check. The user can QA additional weather elements by selecting that element in the Audit column of the table.



Name	Description	Units	Audit	Range	NoMis	Lower bound	Type	Upper bound	Missing indicator
PRCP	Precipitation amount	millimeters * 1000	☐	☐	☐	0	<=	25400	-9
SLVP	Sea level pressure	millibars *10	☐	☐	☐	9000	<	10999	99999
PRES	Station pressure	millibars *10	☑	☐	☐	9000	<	10999	99999
CLHT	Ceiling height	kilometers *10	☐	☐	☐	0	<=	300	999
TSKC	Total//opaque sky cover	tenths//tenths	☑	☐	☐	0	<=	1010	9999
ALC1	Sky cond//height-level 1	code//hundredths ft	☐	☐	☐	0	<=	300	09999
ALC2	Sky cond//height-level 2	code//hundredths ft	☐	☐	☐	0	<=	300	09999
ALC3	Sky cond//height-level 3	code//hundredths ft	☐	☐	☐	0	<=	300	09999
ALC4	Sky cond//height-level 4	code//hundredths ft	☐	☐	☐	0	<=	850	09999
ALC5	Sky cond//height-level 5	code//hundredths ft	☐	☐	☐	0	<=	850	09999
ALC6	Sky cond//height-level 6	code//hundredths ft	☐	☐	☐	0	<=	850	09999
PWVC	Present weather (vicinity)		☐	☐	☐	9292	<=	98300	9999
PWTH	Present weather		☐	☐	☐	9292	<=	98300	9999
ASKY	ASOS Sky condition	tenths	☐	☐	☐	0	<=	10	99
ACHT	ASOS Ceiling	kilometers*10	☐	☐	☐	0	<=	888	999
HZVS	Horizontal visibility	kilometers *10	☐	☐	☐	0	<=	1640	99999
TMPD	Dry bulb temperature	°C *10	☑	☐	☐	-300	<	350	999
TMPW	Wet bulb temperature	°C *10	☐	☐	☐	-650	<	350	999
DPTP	Dew-point temperature	°C *10	☐	☐	☐	-650	<	350	999
RHUM	Relative humidity	whole percent	☐	☐	☐	0	<=	100	999
WDIR	Wind direction	tens of degrees	☑	☐	☐	0	<=	36	99
WSPD	Wind speed	meters/second *10	☑	☐	☐	0	<=	500	-9999

Name

Abbreviated name for each meteorological parameter

Description

Description of the meteorological parameter.

Units

This field cannot be edited. Data for the Surface QA tab are written as integers with some variables having been multiplied by 10 when extracted to retain significant digits.

Audit

There are only five weather elements that are tracked by default during the Surface QA process. The user can track additional weather elements for a particular AERMET run by putting a check mark in the box next to a particular weather element.

Range

Performs a range check during processing when the box is selected. Parameters that fall outside of the range will be reported to the message file.

NoMis

Every time a bound is violated or a value is missing, a message is written to the message file. If one weather element is tracked for reporting (either by default or defined in the Audit column) is missing most of the time (e.g. station pressure in a SCRAM archived file), the message file could become very large. To reduce the number of missing value messages and the size of the message file, put a check mark next to that weather element.

Lower Bound

Lower bound for the parameter. If Units is multiplied by a value (e.g. 10) the bound should also be multiplied by the same value.

Type

The special symbol "<" and the optional "=" indiciated whether to exclude (<) or include (<=)the lower and upper bound values in the QA.

Upper Bound

Upper bound for the parameter. If Units is multiplied by a value (e.g. 10) the bound should also be multiplied by the same value.

Missing Indicator

Missing value indicator for this parameter. This value will show up in the resulting output file each hour this parameter is missing.

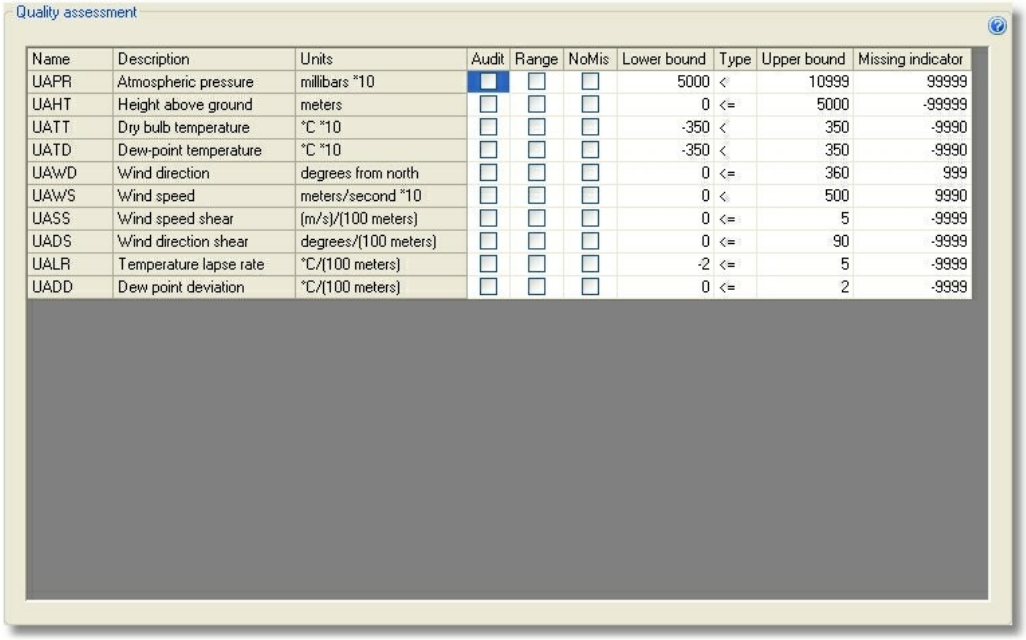
Upper Air QA

Unlike in the Surface Options form, there are no variables that are tracked (audited) automatically in the Upper Air form. The user must specify those variables to QA through the Audit column in the table that is presented when the "Perform Quality Assessment Audit" check box is selected. For each of the specified variables, the value of each variable at each level is compared to a missing value indicator and if the value is not missing, then the value is compared to an upper and lower bound that define the range of acceptable values. Each time a value is missing or violates one of the bounds, a message is written to the message file containing the value, the violation, the date and time of occurrence and the sounding level. The number of times the variable is missing, exceeds the upper bound and exceeds the lower bound is tallied and reported in the summary file.

The number of levels in a sounding and the heights at which the data are recorded vary from sounding to sounding. It is impractical to report on every level. AERMET divides the atmosphere into 10 regions in which to summarize the QA information for the soundings. These regions are based on the thickness increment defined to be 500 meters. These regions are:

- surface (the first level in the sounding),
- every 500 meters up to 4000 meters, and
- everything above 4000 meters.

In the current version of AERMET there are no provisions for automatically replacing missing values or adjusting values that are outside the range of acceptable values. It is up to the user to review the QA summary information and, using sound meteorological principles and any regulatory guidance, either replace the value in question or leave it alone.



Name	Description	Units	Audit	Range	NoMis	Lower bound	Type	Upper bound	Missing indicator
UAPR	Atmospheric pressure	millibars *10	☐	☐	☐	5000	<	10999	99999
UAHT	Height above ground	meters	☐	☐	☐	0	<=	5000	-99999
UATT	Dry bulb temperature	°C *10	☐	☐	☐	-350	<	350	-9990
UATD	Dew-point temperature	°C *10	☐	☐	☐	-350	<	350	-9990
UAWD	Wind direction	degrees from north	☐	☐	☐	0	<=	360	999
UAWS	Wind speed	meters/second *10	☐	☐	☐	0	<	500	9990
UASS	Wind speed shear	(m/s)/(100 meters)	☐	☐	☐	0	<=	5	-9999
UADS	Wind direction shear	degrees/(100 meters)	☐	☐	☐	0	<=	90	-9999
UALR	Temperature lapse rate	°C/(100 meters)	☐	☐	☐	-2	<=	5	-9999
UADD	Dew point deviation	°C/(100 meters)	☐	☐	☐	0	<=	2	-9999

Name

Abbreviated name for each meteorological parameter

Description

Description of the meteorological parameter.

Units

This field cannot be edited. Data for the Surface QA tab are written as integers with some variables having been multiplied by 10 when extracted to retain significant digits.

Audit

There are only five weather elements that are tracked by default during the Surface QA process. The user can track additional weather elements for a particular AERMET run by putting a check mark in the box next to a particular weather element.

Range

Performs a range check during processing when the box is selected. Parameters that fall outside of the range will be reported to the message file.

NoMis

Every time a bound is violated or a value is missing, a message is written to the message file. If one weather element is tracked for reporting (either by default or defined in the Audit column) is missing most of the time (e.g. station pressure in a SCRAM archived file), the message file could become very large. To reduce the number of missing value messages and the size of the message file, put a check mark next to that weather element.

Lower Bound

Lower bound for the parameter. If Units is multiplied by a value (e.g. 10) the bound should also be multiplied by the same value.

Type

The special symbol "<" and the optional "=" indiciated whether to exclude (<) or include (<=)the lower and upper bound values in the QA.

Upper Bound

Upper bound for the parameter. If Units is multiplied by a value (e.g. 10) the bound should also be multiplied by the same value.

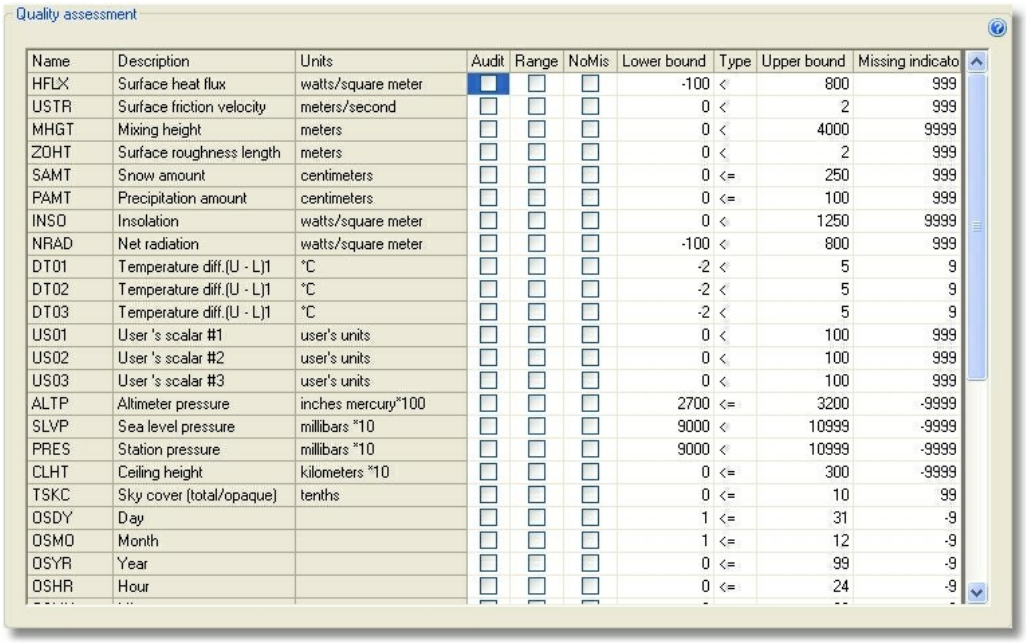
Missing Indicator

Missing value indicator for this parameter. This value will show up in the resulting output file each hour this parameter is missing.

Onsite QA

Unlike in the Surface Options form, there are no variables that are tracked (audited) automatically in the Onsite form. The user must specify those variables to QA through the Audit column in the table that is presented when the "Perform Quality Assessment Audit" check box is selected. For each of the specified variables, the value of each variable at each level is compared to a missing value indicator and if the value is not missing, then the value is compared to an upper and lower bound that define the range of acceptable values. Each time a value is missing or violates one of the bounds, a message is written to the message file containing the value, the violation, the date and time of occurrence and the sounding level. The number of times the variable is missing, exceeds the upper bound and exceeds the lower bound is tallied and reported in the summary file.

For onsite data, the user can only select parameters that have been specified in the Onsite Format tab. An error will be generated if the Audit check box is selected for a parameter that is not identified as present in the data file.


Quality assessment

Name	Description	Units	Audit	Range	NoMis	Lower bound	Type	Upper bound	Missing indicato
HFLX	Surface heat flux	watts/square meter	☐	☐	☐	-100	<	800	999
USTR	Surface friction velocity	meters/second	☐	☐	☐	0	<	2	999
MHGT	Mixing height	meters	☐	☐	☐	0	<	4000	9999
ZOHT	Surface roughness length	meters	☐	☐	☐	0	<	2	999
SAMT	Snow amount	centimeters	☐	☐	☐	0	<=	250	999
PAMT	Precipitation amount	centimeters	☐	☐	☐	0	<=	100	999
INSO	Insolation	watts/square meter	☐	☐	☐	0	<	1250	9999
NRAD	Net radiation	watts/square meter	☐	☐	☐	-100	<	800	999
DT01	Temperature diff.(U - L)1	°C	☐	☐	☐	-2	<	5	9
DT02	Temperature diff.(U - L)1	°C	☐	☐	☐	-2	<	5	9
DT03	Temperature diff.(U - L)1	°C	☐	☐	☐	-2	<	5	9
US01	User 's scalar #1	user's units	☐	☐	☐	0	<	100	999
US02	User 's scalar #2	user's units	☐	☐	☐	0	<	100	999
US03	User 's scalar #3	user's units	☐	☐	☐	0	<	100	999
ALTP	Altimeter pressure	inches mercury*100	☐	☐	☐	2700	<=	3200	-9999
SLVP	Sea level pressure	millibars *10	☐	☐	☐	9000	<	10999	-9999
PRES	Station pressure	millibars *10	☐	☐	☐	9000	<	10999	-9999
CLHT	Ceiling height	kilometers *10	☐	☐	☐	0	<=	300	-9999
TSKC	Sky cover (total/opaque)	tenths	☐	☐	☐	0	<=	10	99
OSDY	Day		☐	☐	☐	1	<=	31	-9
OSMO	Month		☐	☐	☐	1	<=	12	-9
OSYR	Year		☐	☐	☐	0	<=	99	-9
OSHR	Hour		☐	☐	☐	0	<=	24	-9

Name

Abbreviated name for each meteorological parameter

Description

Description of the meteorological parameter.

Units

This field cannot be edited. Data for the Surface QA tab are written as integers with some variables having been multiplied by 10 when extracted to retain significant digits.

Audit

There are only five weather elements that are tracked by default during the Surface QA process. The user can track additional weather elements for a particular AERMET run by putting a check mark in the box next to a particular weather element.

Range

Performs a range check during processing when the box is selected. Parameters that fall outside of the range will be reported to the message file.

NoMis

Every time a bound is violated or a value is missing, a message is written to the message file. If one weather element is tracked for reporting (either by default or defined in the Audit column) is missing most of the time (e.g. station pressure in a SCRAM archived file), the message file could become very large. To reduce the number of missing value messages and the size of the message file, put a check mark next to that weather element.

Lower Bound

Lower bound for the parameter. If Units is multiplied by a value (e.g. 10) the bound should also be multiplied by the same value.

Type

The special symbol "<" and the optional "=" indiciated whether to exclude (<) or include (<=)the lower and upper bound values in the QA.

Upper Bound

Upper bound for the parameter. If Units is multiplied by a value (e.g. 10) the bound should also be multiplied by the same value.

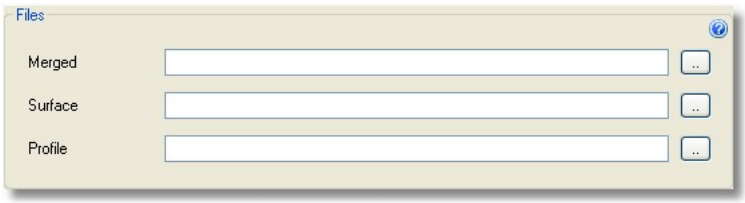
Missing Indicator

Missing value indicator for this parameter. This value will show up in the resulting output file each hour this parameter is missing.

Metprep Options

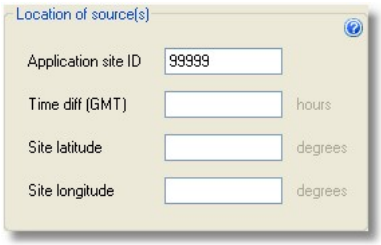
The Metprep Options are where the user can input site-specific location, choose processing options, select the appropriate executables to run, and select the necessary data periods to process from.

Files



The files are where the merged, surface, and profile names are specified. These fields are only enabled when the Merged job type is selected. In AERMET Pro, the fields are read-only and the file names default to the name that was given to the project (i.e. the name of the .ati file).

Location of Sources



Application Site ID

An eight character alphanumeric specifier that identifies the site or facility. This field is simply a means to identify the site and is not used otherwise. By default, this ID is set to "99999".

Time Diff (GMT)

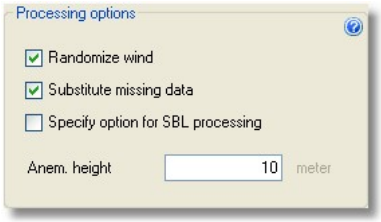
This parameter is an adjustment factor to convert the time of the raw data in the input data file from local standard time back to GMT.

Site Latitude and Site Longitude

Unlike in the raw file fields, the latitude and longitude in the Metprep Options is very important. These coordinates should reflect the location of the source (i.e. the location where the dispersion model is to be applied). These coordinates are used to compute sunrise/sunset and solar elevation, which are required to estimate the surface fluxes and mixing heights.

As before, these values are entered as decimal degrees, and they are **negative** for the **Western & Southern** hemispheres .

Processing Options



Randomize Wind

NWS and ADMS file wind directions are reported to the nearest 10° (e.g. a direction 164° would be reported as 16). In AERMET, these wind directions are adjusted to yield a direction to the nearest degree if this option is selected. This option has no effect when onsite data are available for the hour. It is assumed that the onsite wind direction is reported to the nearest degree and does not need randomizing.

Substitute Missing Data

This option directs AERMET to substitute NWS data in the computations in the event that on-site data are missing for the hour. If some of the variables required for the computations are missing, then this option directs AERMET to substitute NWS data to estimate the boundary layer parameters. Also, if the onsite profiles of wind and/or temperature are missing for an hour, this option directs AERMET to use NWS data to create a single-level profile of wind and/or temperature.

This option is automatically checked and cannot be changed unless the job type is "NWS (US) with Onsite".

Specify Option for Stable Boundary Layer (SBL) Processing

AERMET typically uses values of cloud cover and ceiling height to estimate heat flux under stable conditions. If observations of temperature difference and solar radiation are available, these can be used in place of cloud cover and ceiling height. Selecting this option will write the "METHOD STABLEBL BULKRN" flag into the input file which directs AERMET to use the Bulk Richardson Number Scheme to calculate heat flux under stable conditions.

More information on the implementation of the Bulk Richardson Number Scheme can be found at http://www.epa.gov/scram001/7thconf/aermod/bulkri_eval.pdf.

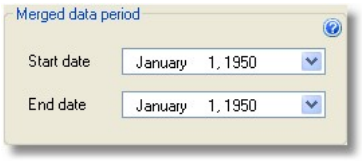
Anemometer Height

Height of the wind data collection instrument used to collect the surface met. data winds. Typically 10 m for NWS met. stations, but the user should always verify.

Executable

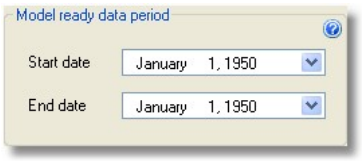
The user can select from the EPA version of the executable (AERMET.exe) or the BREEZE enhanced version (AERMETx.exe).

Merged Data Period



This is the data period that the user wishes the merged data period to cover. This data period can be as long as the raw data period will cover. The fields default to January 1, 1950.

Model Ready Data Period



This is the data period that the model ready meteorological data will span. This range has to be no greater than the merged data period.

Land Use

The Land Use tab is where the user specifies the surface characteristics needed by AERMET to process data for use in AERMOD. These parameters influence the boundary layer parameter estimates. The three parameters are:

- Surface roughness,
- Albedo, and
- Bowen Ratio.

The latest EPA guidance defines two separate methods for determining the above parameters:

- Near-Field: To calculate surface roughness, a 1-kilometer circle is drawn around the meteorological station. This circle can be broken up into a maximum of 12 sectors of 30°, and an inverse-distance weighted average is used to determine the surface roughness by sector.
- Far-Field: A 10km x 10km square area around the meteorological station is drawn and analyzed to determine Bowen ratio and albedo. A simple average of the land use types within the area are calculated independent of both distance from the station and the near-field sectors.

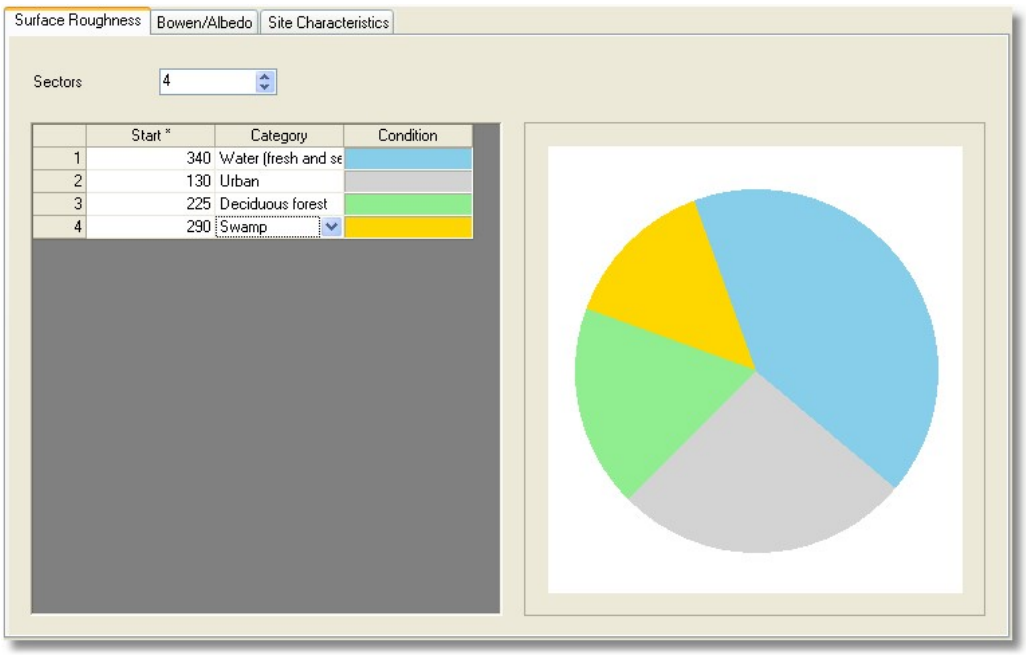
The Land Use tab within BREEZE AERMET is broken into three sections: Surface Roughness, for the Near-Field analysis; Bowen/Albedo, for the Far-Field analysis; and Site Characteristics, where the three surface characteristics are either calculated or input.

Surface Roughness

This part of the land use analysis is conducted by drawing a 1-kilometer circle around the location of the meteorological surface data (i.e. the NWS or onsite met. station) on an aerial photograph or topographic map. Based on the 1-km circle, the user can subjectively determine the surface roughness of up to 12 sectors (i.e no greater than 30° each).

Note: If the user determines that a sector has more than one land use type in it, select the dominant land use type for that sector based on the area of each land use type and its respective distance from the station.

One of eight land use categories (based on figures provided by the EPA in the EPA AERMET User's Guide) can be chosen for each sector.

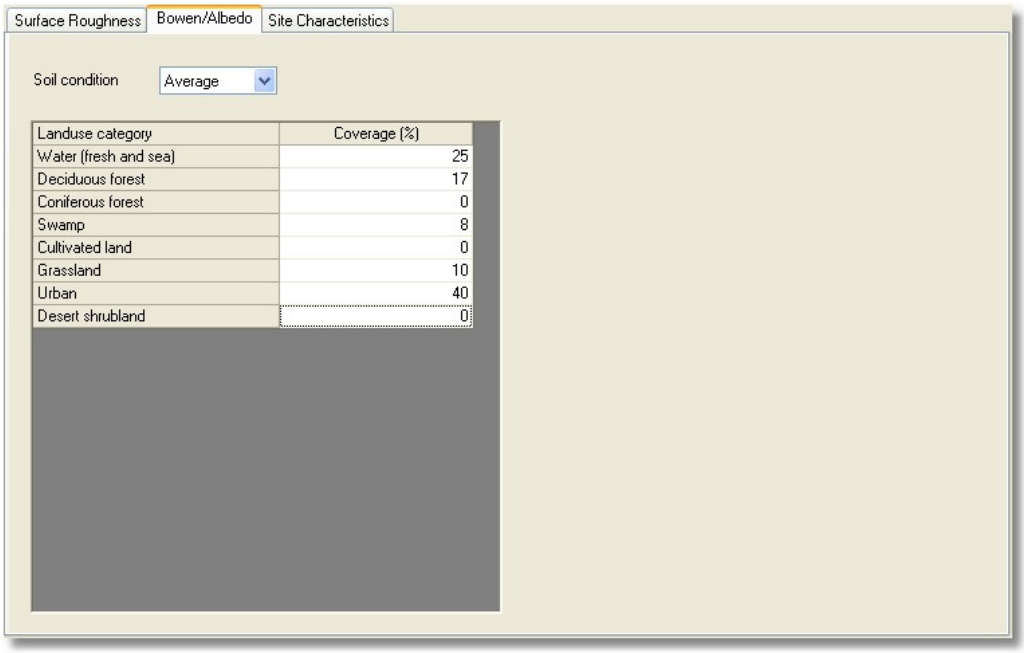


Bowen/Albedo

This section of the land use analysis is conducted by drawing a 10-kilometer by 10-kilometer area around the same location used in the Surface Roughness section. The user should subjectively analyze this area to determine percentages of the eight dominant land use categories. These percentages can be a simple average and are independent of distance from the meteorological station.

These percentages can be anywhere from 0-100, and the total must add up to 100.

The Soil condition is also specified on this tab. The selection made by the user (Average, Dry, or Wet) only affects the Bowen ratio calculations on the Site Characteristics tab.

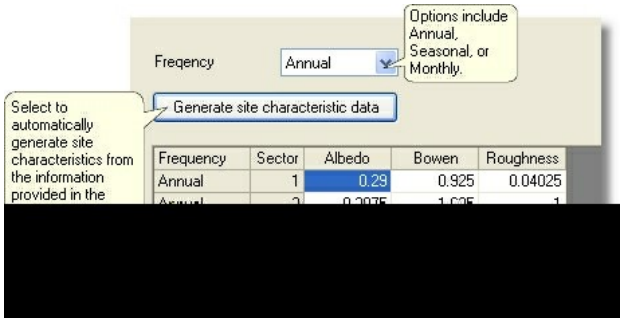


Site Characteristics

The three surface parameters are calculated (or input) by the user in this tab. The surface parameters can be input on the Annual, Seasonal, or Monthly time period. There are three options for entering the site characteristics:

Automatically Generate

Based on the sectors defined the in the Sectors tab, BREEZE AERMET will automatically calculate the surface parameters based on the values provided in Tables 4-1 through 4-3 of the EPA AERMET User's Guide.


Options include Annual, Seasonal, or Monthly.
Freqency
Annual
Select to automatically generate site characteristics from the information provided in the
Generate site characteristic data
Frequency Sector Albedo Bowen Roughness
Annual 1 0.29 0.925 0.04025

Manually Select

Another option is based on previous versions of BREEZE AERMET. By right-clicking on an open field, the EPA tables will open up and the user can select a value by double-clicking it.

Site_manual

Manually Enter

The user can also choose to either hand key or copy-and-paste values from an external table (such as a spreadsheet).

Note: If the user chooses to manually enter in surface parameters, they must still select land use categories for each sector in the Surface Roughness tab.

You can learn more about each of the surface parameters here.

Surface Parameters

Albedo

The albedo is the fraction of total incident solar radiation reflected by the surface back to space without absorption. Typical values range from 0.1 (for thick deciduous forests) to 0.90 (for fresh snow).

Bowen Ratio

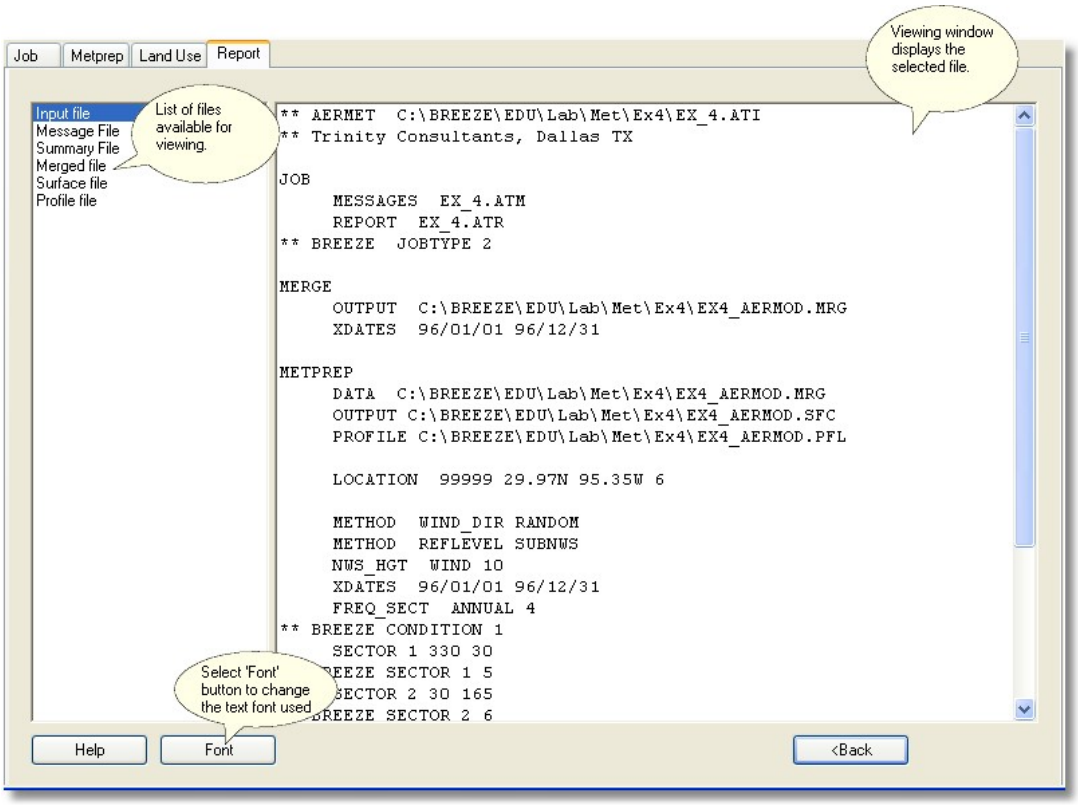
The daytime Bowen ratio, an indicator of surface moisture, is the ratio of the sensible heat flux to the latent heat flux. It is used for determining planetary boundary layer parameters for convective conditions. While the diurnal variation of the Bowen ratio may be significant, the Bowen ratio usually attains a fairly constant value during the day. Midday values of the Bowen ratio range from 0.1 (over water) to 10.0 (over desert).

Surface Roughness

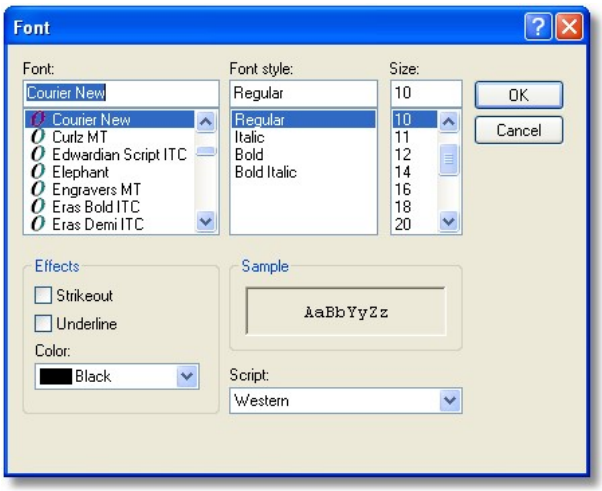
The surface roughness length is related to the height of obstacles to the wind flow and is, in principle, the height at which the mean horizontal wind speed is zero. Values range from less than 0.001 m (over a calm water surface) to 1 m or more (over a forest or urban area).

Reports

The Report tab is where the input and output files can be viewed directly in the BREEZE AERMET program.



The tab consists of two panes: the right pane displays the selected files, and the left pane lists the files that can be viewed in the display pane. There is a button at the bottom which the user can select to change the font of the Report tab, as well. Changes made to the font will only be applied to the display pane in the Report tab.



Font Selection Window

Delete On-Site Receptors

Use this tool to delete all discrete (not gridded) receptors inside a boundary receptor network(s). To remove gridded receptors located inside a particular receptor grid, use the *Disable onsite receptor* option in the gridded receptor form.

Starting the Delete On-Site Receptors Tool

From the Tools menu, select the *Delete On-Site Receptors* menu item.

Delete Off-Site Receptors

Use this tool to delete all discrete (not gridded) receptors outside a boundary receptor network(s). To remove gridded receptors located outside of a particular receptor grid, use the *Disable offsite receptor* option in the gridded receptor form.

Starting the Delete Off-Site Receptors Tool

From the Tools menu, select the *Delete Off-Site Receptors* menu item.

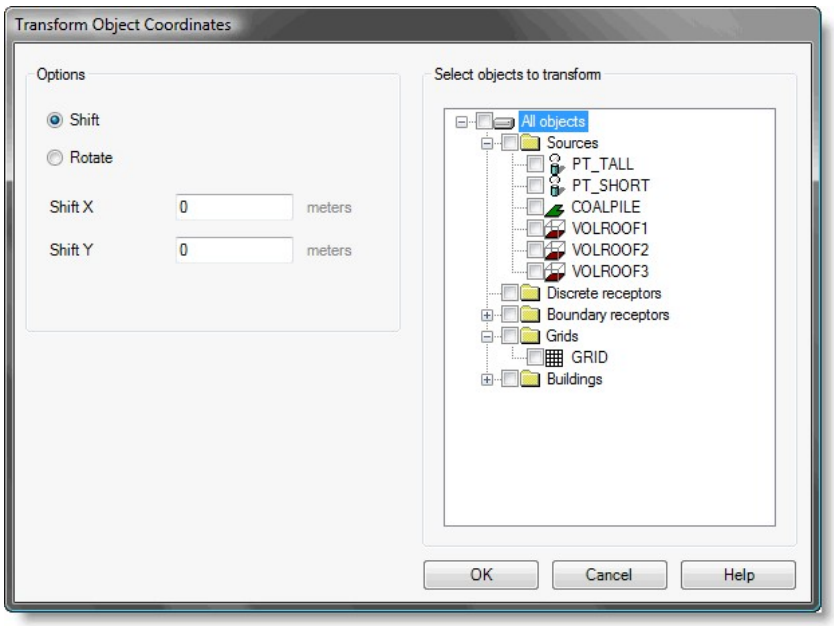
Transform Object Coordinates

NOTE: This utility is **only available in the Professional version** of BREEZE AERMOD/ISC. To upgrade your version, contact us.

There may be times when you need to either shift or rotate the coordinates of model objects (e.g., source, buildings, receptors) that are included in your project scenario. BREEZE provides the *Transform Object Coordinates* tool to make that process easy.

Starting the Transform Object Coordinates Tool

From the Tools menu, select the *Transform Object Coordinates* menu item. The following utility application will be displayed:



Shift: Select this option to shift model objects. Once the shift operation has been completed, model objects will be moved along X axis and Y axis by the values given in Shift X and Shift Y fields.

Rotate: Select this option to rotate model objects. Once the rotate operation has been completed, model objects will be rotated (clockwise if positive) the specified number of degrees around a user defined center point.

Shift X: Displayed when the Sift option is selected. Specify the distance to move along X axis.

Shift Y: Displayed when the Sift option is selected. Specify the distance to move along Y axis.

Center X: Displayed when the Rotate option is selected. Center point's X coordinate.

Center Y: Displayed when the Rotate option is selected. Center point's Y coordinate.

Rotate: Displayed when the Rotate option is selected. Enter the number of degrees to rotate the model object.

Shifting or Rotating Coordinates

1. Select either the *Sift* or *Rotate* option.
2. Enter the appropriate shift or rotate parameters.
3. Place check marks next to the model objects that you wish to perform the shift or rotate operation on.
4. Press the OK button to complete the operation.

Note: For Cartesian grid receptor networks, when rotating a grid network, the network's handle will be rotated around the center point by the given degrees; however, the X axis always points to due east and the Y axis always points to due north.

Import Model Object

Import Model Object

The Import Model Object tool allows the user to import model objects, including sources, receptor grids, discrete receptors, boundary receptors and buildings from other projects. The supported files include, BREEZE AERMOD and ISC input files (.dat), BREEZE AERMOD 6 input files (.ami), Source files (.pnt), Receptor files (.rec) and building files (.bld).

Starting the Import Model Object Tool

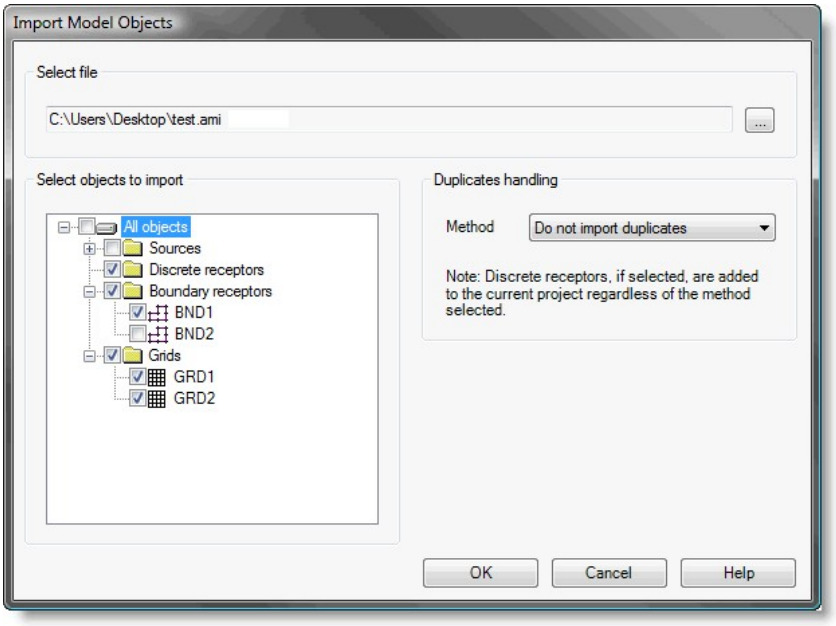
From the Tools menu, select the *Import Model Object* menu item.

To import model objects:

1. Click on the browse button in the *Select file* group box and locate the file you wish to import. The following are the file types that can be imported:

AERMOD Input Files (*.ami, *.inp, *.dat)
ISC Input File (*.dat, *inp)
Source Files (*.pnt)
Receptor Files (*.rec)
Building Files (*.bld)
Source Include Files (*.ins)
Receptor Include Files (*.inr)
BPIP Input Files (*.bpi, *inp)

2. Model objects contained in the opened file are listed in the *Select objects to import* group box. Place a check mark in the boxes next to the model objects you want to import. Click on the plus signs to expand the model object type folders to select specific model object IDs.

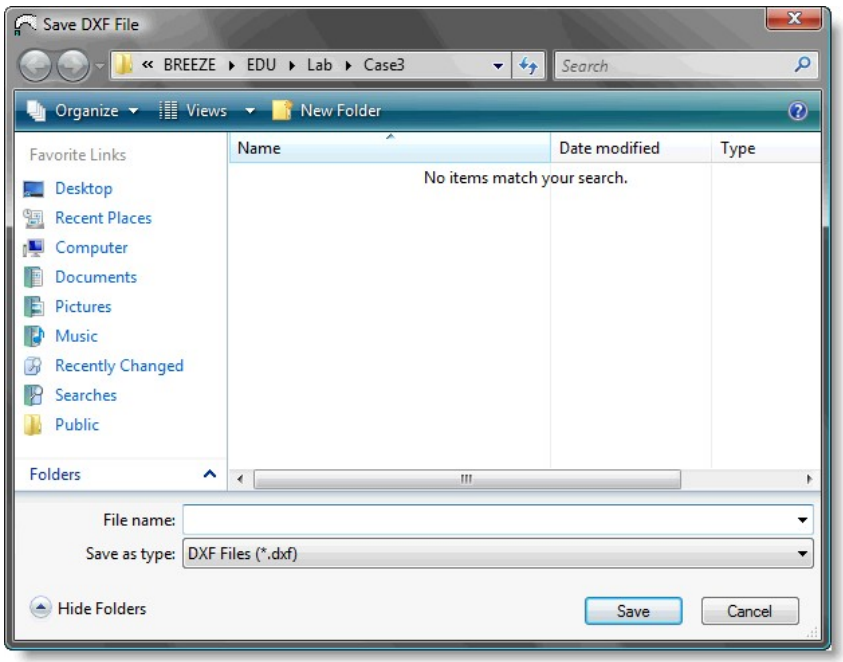


3. Press the OK button to import the selected model objects.

Export Objects to DXF

This utility allows the user to save all model objects in the project to a DXF file so that they may be imported into AutoCAD.

Selecting the utility brings up the save file dialog box. Name the file and the objects are exported to DXF format.



Annotations

NOTE: This utility is **only available in the Professional version** of BREEZE AERMOD/ISC. To upgrade your version, contact us.

Annotation objects are a new feature to BREEZE AERMOD/ISC. These are non-model-related objects that can be used to better identify points, lines, or areas in the Map view. These objects will have no affect upon modeling results and are for visualization purposes only.

Zip File Manager

In BREEZE AERMOD 7, the input file, met data files, image files, and output files are all contained into one zip file with an extension .amz. This simplifies file management. The Zip File Manager provides the user a tool to select the specific files to unzip for post-processing analysis.

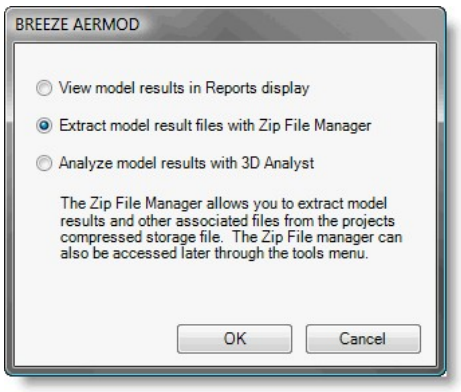
The Zip File Manager Users no longer need worry about supplying file names or directory paths for many of the output file options. Directory and file names are automatically assigned. BREEZE Version 6 creates a new compressed file (i.e., zipped) that contains the majority of input and output files -- including meteorological data files. The file can be unzipped or accessed directly using the new BREEZE 3D Analyst utility.

This compressed file can easily be emailed to others collaborating on your project.

Starting the Zip File Manager

There are two ways to launch this tool.

1. From the *Tools* menu, select the *Zip File Manager* menu item
2. After a model run completes, a form is displayed giving the user the option to launch either the Zip File Manager or 3D Analyst. Choose the option to extract model result files with the Zip File Manger.

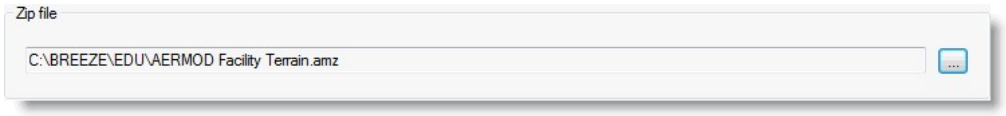

BREEZE AERMOD
View model results in Reports display
Extract model result files with Zip File Manager
Analyze model results with 3D Analyst
The Zip File Manager allows you to extract model results and other associated files from the projects compressed storage file. The Zip File manager can also be accessed later through the tools menu.
OK
Cancel

Extract Files

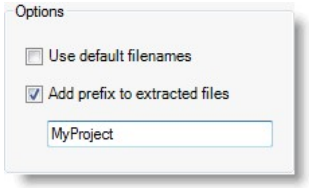
The Zip File Manager can be used to extract (i.e., decompress) the archived files from the .amz project file.

To extract files:

1. Select the desired .amz archive file. The .amz files are created when you perform a model run using either the Model Run or Scheduler options available in the Analysis menu.

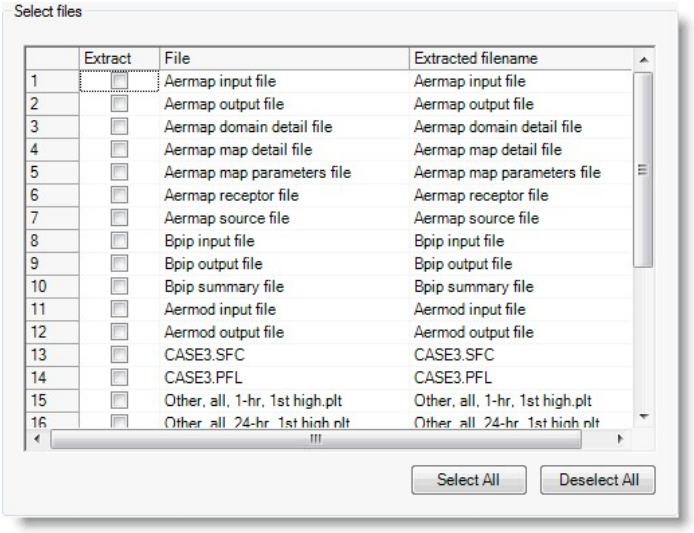


2. Choose the naming convention you would like to use for the extracted files.

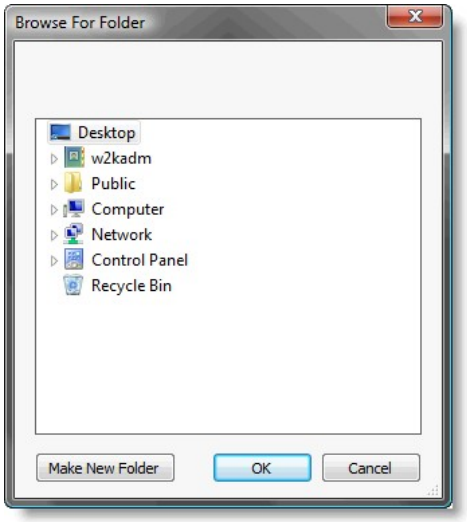


Use default filenames: Select this option if you wish to use the default file names determined by BREEZE. The file names will reflect the type of data within the file. If this option is not checked, a the *Extracted filename* column will appear in the *Select files* group box. User defined file names for each file can be entered by the user by simply typing over the default file names.
Add prefix to extracted files: Select this option to provide a user defined prefix to the extracted files. This option allows you to better identify the files once they are extracted. For example,

3. Select the files you wish to extract by placing a check mark in the respective check box. If the *Use default filenames* option is not selected, you have the option of typing in your own file names.


Select files
Extract
File
Extracted filename
1 Aermap input file Aermap input file
2 Aermap output file Aermap output file
3 Aermap domain detail file Aermap domain detail file
4 Aermap map detail file Aermap map detail file
5 Aermap map parameters file Aermap map parameters file
6 Aermap receptor file Aermap receptor file
7 Aermap source file Aermap source file
8 Bpip input file Bpip input file
9 Bpip output file Bpip output file
10 Bpip summary file Bpip summary file
11 Aermod input file Aermod input file
12 Aermod output file Aermod output file
13 CASE3.SFC CASE3.SFC
14 CASE3.PFL CASE3.PFL
15 Other, all, 1-hr, 1st high.plt Other, all, 1-hr, 1st high.plt
16 Other, all, 24-hr, 1st high.plt Other, all, 24-hr, 1st high.plt
Select All
Deselect All

4. Click on the Extract button, a Browse For Folder window will display. Choose or create a directory where you want the extracted files to be saved. Click the OK button.



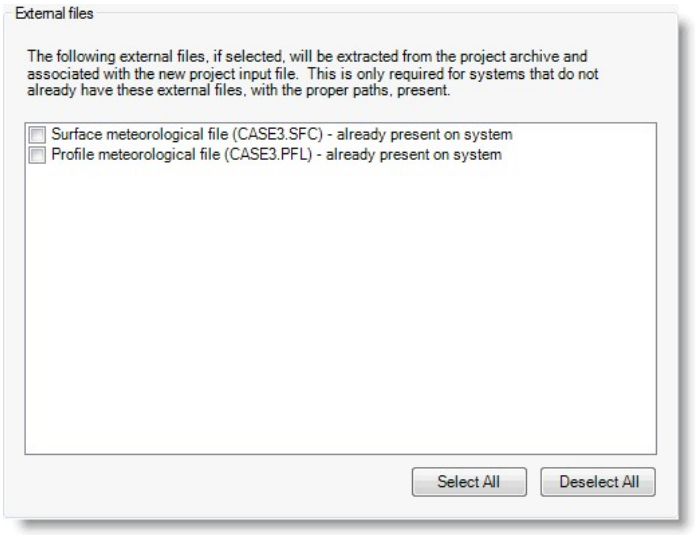
Extract Project

Users can create copy of their compressed archived project file and a BREEZE AERMOD input file (.ami).

To extract a project, select the *Extract* button. You will be prompted to provide a name to call the new project. Provide a name and press teh OK button. The input .ami and archived .amz file will be created.

External Files

External input files such as meteorological data files can optionally be included in the archived .amz file by placing a check mark in the check box next to the file name. If the archive file is not being sent to another computer, the user may not want to include the files in the archive.


External files
The following external files, if selected, will be extracted from the project archive and associated with the new project input file. This is only required for systems that do not already have these external files, with the proper paths, present.
Surface meteorological file (CASE3.SFC) - already present on system
Profile meteorological file (CASE3.PFL) - already present on system
Select All
Deselect All

Coordinate Conversion

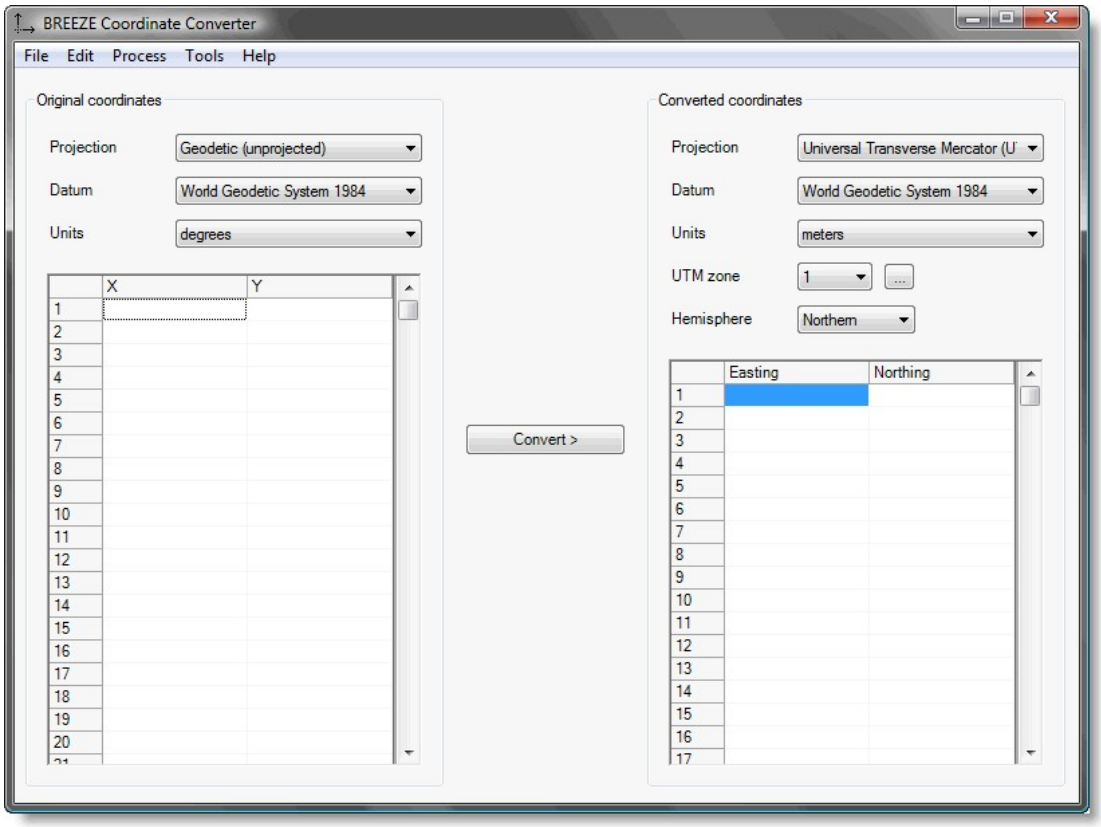
NOTE: This utility is **only available in the Professional version** of BREEZE AERMOD/ISC. To upgrade your version, contact us.

BREEZE AERMOD has a tool to convert coordinates between geographic system (Lat/long), UTM system and lambert system.

This tool is compatible with copy-and-paste functions. Copying original coordinates from a spreadsheet often simplifies the data entry process.

Starting the Coordinate Conversion Tool

From the Tools menu, select the *Coordinate Conversion* menu item. The following form will be displayed:



Original coordinates

Projection: Select the projection from which you want to convert from. Geodetic (unprojected) would be equivalent to Longitude and Latitude.

Datum: Select the datum from which you want to convert from.

Units: Select the units the coordinates are in.

Input the value(s) of the coordinates you want to convert from in the grid. If converting Longitude and Latitudes, the X coordinate is equivalent to the Longitude.

Longitude and Latitude values should be in decimal degrees. Longitude is negative in the west hemisphere. Latitude is negative in the south hemisphere.

Converted coordinates

Select the parameters you wish to project the original coordinates into.

Convert

Click on this button to convert the original coordinates to the desired coordinates.